FIELD SERVICE POCKET BOOK.

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FIELD SERVICE POCKET BOOK.

1911.

GENERAL STAFF, WAR OFFICE.

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ABBREVIATIONS.

Abbreviations denoting names of corps such as R.H.A., A.S.C., &c., are omitted.

"A" before an abbreviation signifying a principal staff officer, or the head of a service or department, means Assistant. similarly "Dep." signifies Deputy, thus:—

A.A.G. ... ... Assistant Adjutant General.
A.D. Sigs. ... Assistant Director of Army Signals.
A.P.M. ... ... Assistant Provost Marshal.
Dep.A.G. ... Deputy Adjutant General.
Dep.D.M.S. ... Deputy Director of Medical Services
Dep.J.A.G. ... Deputy Judge Advocate General.

5° ... ... 5 degrees.
5′ ... ... 5 feet or 5 minutes (geographically only)
5″ ... ... 5 inches or 5 seconds.
5ˣ ... ... 5 yards.

A.A.	Army Act.
A.B.	Army Book.
A.F.	Army Form.
A.D.C.	Aide-de-Camp
Admn.	Administration.
Adv. Gd. ...	Advanced guard.
A.G.	Adjutant General.
Ammn.	Ammunition.
A. and S. ...	Ammunition and Store.
A.M.O.	Administrative Medical Officer.
A.O.	Army Order.
A.P.	Armour Piercing.
Art.	Artillery.
Batty.	Battery.
B.C.	Battery Commander.
Bde.	Brigade.
B.M.	Brigade Major.
Bn.	Battalion.
Br.	Bombardier or Bugler.
Brig.-Gen. ...	Brigadier-General.
Capt.	Captain.
Cav. ...	Cavalry.
C.B.	Confinement to Barracks.
C.C.	Confinement to Camp.
C.D.C.	Coast Defence Commander.
C.G.S.	Chief of the General Staff in the field.
Col.	Colonel.
Coln.	Column.
Comdt.	Commandant.
Comdr.	Commander.
C.-in-C.	Commander-in-Chief.
Comdg. ...	Commanding.
C.O.	Commanding Officer.
Co.	Company.
Cpl.	Corporal.
Det.	Detachment.
Dept.	Department.
Dep.J.A.G. ...	Deputy Judge Advocate General.
Dist.	District.
Div.	Division.
Dn. ...	Dragoon.
D.G.	Dragoon Guard.
Dr.	Drummer or Driver.
D.R.F.	Depression Range-Finder
D. Sigs. ...	Director of Army Signals.
D.M.S.	Director of Medical Services.
D.O.S.	Director of Ordnance Services
D. Post... ...	Director of Postal Services.
D.R.T.	Director of Railway Transport.
D. Remounts	Director of Remounts.
D.S.	Director of Supplies.
D.S.T.	Director of Sea Transport
D.T.	Director of Transport.
D.V.S.	Director of Veterinary Services.
D.W.	Director of Works.
Est.	Establishment.

Fd. Amb.	...	Field Ambulance.
F.C. ...	...	Fire Commander.
Fd. Co. ...	...	Field Company.
F.G.C.M.	...	Field General Court Martia
Fd. Imp.	...	Field Imprisonment.
F.M. ...	...	Field Marshal.
F.O. ...	...	Field Officer.
F.S.M. ...	...	Field Service Manual.
F.S.R. ...	...	Field Service Regulations.
f.s. ...	...	Feet per second.
G.C. ...	...	Gun Captain.
G.C.M. ...	...	General Court Martial.
Gd. ...	...	Guard.
G.G.C. ...	...	Gun Group Commander.
G.O.C. ...	...	General Officer Commanding.
Gr. ...	...	Gunner.
G.S. ...	...	General Staff, also General Service.
Hd. Qrs.	...	Headquarters.
H.E. ...	...	Horizontal Equivalent, also High Explosive.
Howr. ...	...	Howitzer.
Hosp. ...	...	Hospital.
Hr. ...	...	Hussar.
I.A. ...	...	Indian Army.
i/c... ...	...	In charge of.
I.G.C. ...	...	Inspector-General of Communications
Inf. ...	...	Infantry.
J.A.G. ...	...	Judge Advocate General.
Lieut. ...	...	Lieutenant.
Lt. Gen....	...	Lieutenant-General.
L. of C. ...	...	Line of Communication.
Lr. ...	...	Lancer.
M.G. ...	...	Machine Gun.
Maj.-Gen.	...	Major-General.
Med. ...	...	Medical.
M.F.P. ...	...	Military Foot Police.
M.I. ...	...	Mounted Infantry.
M.L. ...	...	Muzzle Loader.
M.L.O. ...	...	Military Landing Officer.
M.P. ...	...	Military Police.
M.M.P. ...	...	Military Mounted Police.
M.F.E. ...	...	Manual of Field Engineeri
M.O. ...	...	Medical Officer.
Mtd. ...	...	Mounted.
m.v. ...	...	Muzzle Velocity.
m.p.h. ...	...	Miles per hour.
N.C.O. ...	...	Non-commissioned Officer.
O.C. ...	...	Officer Commanding.
Offr. ...	...	Officer.
O.O. ...	...	Ordnance Officer.
Ord. ...	...	Ordnance.
O.R.S. ...	...	Orderly room Serjeant.

P.C.	Principal Chaplain.
P.M.	Provost Marshal.
Pmr.	Paymaster.
P.O.	Post Office.
Pte.	Private.
P.W.	Royal Warrant for Pay and Promotion.
Q.F.	Quickfiring.
Qr. Mr.	Quartermaster.
Q.M.G.	Quartermaster-General.
Q.M.S.	Quartermaster-Serjeant.
R.C.M.	Regimental Court Martial.
R.F.	Representative Practice.
R.T.O.	Railway Transport Officer.
Rgt.	Regiment.
R.M.	Riding Master.
S.A.A.	Small Arm Ammunition.
Sect.	Section.
Sjt.	Serjeant.
Sig. O.	Signalling Officer.
S.M.	Serjeant-Major.
S.O.	Staff Officer.
Sqn.	Squadron.
Sup. O.	Supply Officer.
Tel.	Telegraphs.
Tel. Co.	Telegraph Company.
T.O.	Transport Officer.
T. & S.	Transport and Supply.
Tp.	Troop.
Tpr.	Trooper.
Tr.	Trumpeter.
Vety.	Veterinary.
V.I.	Vertical Interval.
W.E.	War Establishments.

DEFINITIONS

(For special definitions of terms used in overseas expeditions see p. 74).

ABATIS. An obstacle formed of trees or branches of trees picketed to the ground with their points towards the enemy.

ACCOUTREMENTS comprise belts, pouches, bandoliers, slings, mess tins, haversacks, water bottles, and similar articles (other than arms) carried outside the clothing.

ADMINISTRATIVE COMMANDER. An officer vested with the command of administrative troops only.

ADMINISTRATIVE DEPARTMENTS. The departments of the Judge Advocate General and Principal Chaplain.

ADMINISTRATIVE SERVICES. Intercommunication, medical, supplies, transport, ordnance, railways, works, remounts, veterinary, postal.

ADMINISTRATIVE TROOPS. Troops, combatant or otherwise, belonging to the administrative services, including R.E. other than those of field units and Army Pay Corps.

ADVANCED BASE. The area ~~at the head of the L. of~~ C. within nearest the railhead which are situated the advanced depôts of ammunition, supplies, animals, and material, from which issues to field units are made.

ALIGNMENT. Any straight line on which a body of troops is formed, or is to form.

BANQUETTE. A bank upon which men stand to fire over a parapet.

BASE. The locality or district from which a L. of C. originates, ~~and in which the principal reserves of all requirements of the forces in the field are accumulated.~~

BASIN. A small area of level ground surrounded (or nearly so) by hills; a district drained by a river and its tributaries.

BAULK. A road bearer in a military bridge.

BAY. The distance bridged by one set of baulks.

BENCH MARK. A stone placed to mark a level accurately fixed by instruments.

BERM A small space left between the parapet and excavations of a work.

BIGHT. A loop formed on a rope, the two parts of which lie alongside one another.

BILLETING. *See* Chap. II., Sect. 9.

BIVOUAC. An encampment without tents or huts.

BOMB-PROOF. A shelter, proof against the penetration of shells.

CALIBRE. The diameter of the bore of a gun in inches measured across the lands.

CAPONIER. A small chamber formed in the ditch of a work projecting from the escarp to give fire down a ditch.

CASEMATE. A shell-proof chamber constructed for the accommodation of a garrison of a work or position.

CHESS. A plank forming a portion of the flooring of a bridge.

COL. A depression between two adjacent hills: a break in a ridge; the neck of land connecting an outlying feature with the main range.

COLUMN. Bodies of troops formed one in rear of another.

COMMAND (Mil. Eng.). Vertical height of the crest of a work above the natural surface of the ground.

COMMANDER. An officer vested with the command of a detachment, unit, or formation of fighting or administrative troops.

CONTOUR. A contour is the representation on a map of an imaginary line running along the surface of the ground at the same height above mean sea level throughout its length.

CONTRIBUTION. A levy made as a punishment on a town or community (*see* "Manual Military Law" and Chapter 7)

COSSACK POST. A "group" in outpost mounted troops (*see* Group).

COUNTERSCARP. The side of the ditch of a work furthest from the parapet.

CREST (Mil. Eng.). The intersection of the interior and superior slopes of a parapet.

CREST (TOPO.). The edge of the top of a hill or mountain; the position at which a gentle slope changes to an abrupt one.

CRIB-PIER. A support for a bridge formed of layers of baulks of wood laid alternately at right angles to each other.

cannot be covered

DEAD GROUND. Ground which [redacted] by fire.

DEFILE. A portion of the route which troops can only traverse on a narrow front, *e.g.*, a mountain pass, a bridge, an embankment.

DERRICK. A single spar held by four guys, used for lifting or moving weights.

DISTANCE. The space between men or bodies of troops from front to rear.

ECHELON. A formation of successive and parallel units facing in the same direction, each on a flank of, and to the rear of, the unit in front of it.

EMBRASURE. A channel through the parapet of a work through which a gun is fired.

EPAULMENT. A small parapet to give cover to a gun and detachment in action.

ESCARP. The side of a ditch nearest the parapet.

FASCINE. A long bundle of brushwood used for revetting.

FIELD ARMY. That portion of the forces in the field not allotted to fortresses, coast defences or garrisons.

FIELD DEPÔT. A small temporary depôt of supplies in the immediate vicinity of the field units.

FIELD UNITS. Mobile units of the field army allotted to divisions, army troops, etc., or L. of C. defence troops.

FIGHTING TROOPS. Infantry, M.I., cavalry, artillery (including ammunition columns), and engineer field units. The headquarters of commanders of fighting troops are fighting units.

FIRE, ENFILADE. Fire the line of which sweeps troops or defences from a flank.

FIRE, DIRECT LAYING. When the gun is laid by looking over or through the sights at the target.

FIRE, FRONTAL. Fire the line of which is perpendicular to the front of the target.

FIRE, HIGH ANGLE. Fire from all guns and Howitzers at all angles of elevation exceeding 25°.

FIRE, INDIRECT LAYING. When the gun is laid for direction on an aiming point or on aiming posts and elevation adjusted by sight clinometer.

FIRE, OBLIQUE. Fire the line of which is inclined to the front of the target.

FIRE, REVERSE. Fire which is directed against the rear of a target.

FILE. A front rank man and his rear rank man.

FORCES IN THE FIELD. The whole of the military forces mobilized in the theatre of operations under the supreme command of the C. in C. Includes the field army or armies, fortress, coast defence and garrison troops.

FORM LINE. An approximate contour; a sketch contour.

FOUGASSE. A small mine filled with stones which are projected towards the enemy on the mine being fired.

GABION. An open cylinder of brushwood, sheet iron, &c., used for revetting.

GLACIS. The ground round a work within close rifle range. Sometimes formed artificially.

GORGE (Topo.). A rugged and deep ravine. (Mil. Eng.). The face of a work least prepared to receive frontal fire.

GRADIENT. A slope expressed by a fraction. $\frac{1}{30}$ represents a rise or fall of 1' in 30'.

GROUP. On outpost duty, a sentry post of from 3 to 6 men.

GUY. A rope fastened to the tip of a spar or frame, to support, raise, or lower it.

GYN. A tripod constructed with three spars, used for raising weights.

HEADERS. Sods, sandbags, etc., placed so that the longest side is at right angles to the face of the structure.

HEADQUARTERS (ARMY). The headquarters of the commander of an army or group of divisions. If divisions are not grouped in separate armies, army headquarters and general headquarters become identical, and the latter term will be used.

HEADQUARTERS (GENERAL). The headquarters of the Commander-in-Chief of the forces in the field.

HORIZONTAL EQUIVALENT. The distance in plan between two adjacent contours measured in yards.

HORSES LENGTH. 8 feet.

" WIDTH. 3 feet, which includes 3 inches outside the rider's knee on either side.

INTERCOMMUNICATION TROOPS. Troops employed on the service of intercommunication. Include airline, cable, wireless, divisional, and L. of C. telegraph companies, but not regimental signallers on the establishments of other units.

INTERVAL. The lateral space between men, units, or corps measured from flank to flank.

LINES OF COMMUNICATION. The systems of communication by rail, road, waterways, telegraph, telephone and visual signalling between the army and its base or bases inclusive, together with the district through which they pass, as the C. in C. may determine.

L. OF C. DEFENCES. That portion of the L. of C. for the defence of which the commander of L. of C. defences is made responsible by the C. in C., together with all fortifications and defences in that area.

L. OF C. DEFENCE TROOPS. That portion of the field army which is detailed for the defence of the L. of C.

L. OF C. UNITS. Administrative units on the L. of C. and under the command of the I.G.C.

MAGNETIC MERIDAN. A magnetic north and south line.

MAGNETIC VARIATION. The angle between the true and magnetic meridians.

MERIDIAN. A true north and south line.

MOBILIZATION is the process by which an armed force passes from a peace to a war footing. The mobilization, therefore, of a unit means its completion for war in men, horses, and material.

ORDERS. OPERATION. Orders which deal with all strategical and tactical operations and which include such information regarding supply, transport, etc., as it is necessary to publish to the troops.

ORDERS, ROUTINE. Orders which deal with matters not concerned with operations such as discipline, interior economy.

ORDERS, STANDING. Orders issued to adapt existing regulations to local conditions and to save frequent repetitions in operation and routine orders.

PACE. The denomination of different degrees of speed; also a measurement of distance (30 inches).

PARADOS. A traverse to give cover from reverse fire.

PATROL. A body of men sent out to reconnoitre, or to guard against surprise.

PLOTTING. The process of laying down on paper field observations and measurements.

POSITION OF OBSERVATION (artillery) implies batteries in action watching all ground in their field of fire and ready to open fire.

POSITION OF READINESS (artillery) implies batteries limbered up under cover with positions in the immediate neighbourhood reconnoitred and everything ready for their occupation.

PROFILE. The section of a parapet at right angles to the crest.

PRIMERS. Small discs of dry guncotton used to detonate wet guncotton (see page 111).

RAILHEAD. The forward terminus of the railway system on the L. of C. open to traffic.

REDOUBT. A work entirely enclosed by a defensible parapet, which gives rifle fire all round.

RE-ENTRANT. A valley or depression running into a main feature.

REFILLING POINTS. Places detailed in orders at which ammunition or supply columns are refilled from the L. of C.

RELIEF. The length of time that men have to work before being relieved, or a number of men who work, or are on duty, for a given length of time.

REQUISITION. A mode of making inhabitants of a district contribute supplies, &c., to an army. Must be paid for (see page 45), but a Requisition Receipt Note implies no promise to pay.

REVETMENT. Any material formed into a retaining wall to support earth at a steeper slope than the natural one.

RIBAND. A baulk fastened down on each side of a roadway to keep the chesses in place.

SADDLE. *See* Col.

SANGAR. A dry built stone wall to give protection against rifle fire.

SAP. A trench formed by constantly extending the end.

SCALE. The proportion which a distance between any two points on a map bears to the horizontal distance between the same points on the ground.

SECTION. Cavalry. 4 front rank men with their coverers.
Artillery. 2 guns of a battery with their attendant men, horses, and wagons.
Infantry or M.I. The quarter of a company.
Topography. The outline of the intersection of the surface of the ground by a vertical plane.
" OF DEFENCE. A portion of a defensive position which is allotted to a distinct body of troops.

SERREFILE. Such officers, N.C.O.'s or men, as may be detailed to ride in rear of the rear rank of a squadron when in line.

SHEERS. Two spars lashed together at the tip and raised to rest on their butts, which are separated. They are used to lift and move weights in one plane.

SLOPE. Exterior. The outside slope of a parapet extending downwards from the superior slope.
Interior. The inside slope of a parapet extending from the crest to the banquette.
Superior. The top of a parapet immediately forward from the crest.

SPAN. The horizontal distance between the centres of any two supports of a bridge.

SPLINTER-PROOF. A shelter, proof against splinters of shell.

SPOT LEVEL. The record on a map of the exact height of a particular point.

SPUR. (Topo.). A projection from the side of a hill or mountain running out from the main feature.

SQUAD. The half of a section or a small number of men.

SQUADRON. Tactical unit of cavalry, 3 or 4 troops.

STAFF, THE. Staff officers appointed to assist commanders in the discharge of their duties.

STRETCHERS. Sods, sandbags, etc., placed so that their longest side is parallel to the face of the structure.

SUBORDINATE COMMANDER. Any commander other than the C. in C., *e.g.*, of a division, brigade, divisional artillery, &c.

SUPPLIES. Food, forage, fuel, light and disinfectants.

TACKLE. Any system of blocks and ropes by which power is gained at the expense of time (*i.e.*, more power, less speed).

TAMP, TO. To cover a charge over with earth or other material so as to confine the gases at the commencement of an explosion, and thus develop their forces more fully.

TASK. The amount of work to be executed by a man during a relief.

THEATRE OF OPERATIONS. The whole area of land or sea in which fighting may be expected or in which movements are liable to interruption by the enemy.

TRACE. The outline of a work in plan.

TRAVERSE (Mil. Eng.). A bank of earth erected to give lateral cover.

TRAVERSE (Topo.). The survey of a road, river, or track by measuring a continuous series of straight lines along its course and the angles at their junctions.

TROOP. A sub-division of a squadron, corresponding to a section in the infantry.

VEDETTE. A sentry of mounted troops.

VERTICAL INTERVAL. The difference of level between two adjacent contours in feet.

WATERSHED. A ridge of high land separating two drainage basins; the summit of land from which water divides or flows in two directions. It does not necessarily include the highest points of a range.

WATTLE. Continuous brushwood hurdle work.

WING. The half of a regiment or larger body of cavalry.

FIELD SERVICE POCKET BOOK.

CHAPTER I.

1. WAR ESTABLISHMENTS.†

Information regarding the war establishment and war outfit of regular units can be derived from the following sources.

Men and animals	War Establishments. *Transport, Remount and Veterinary Manuals, War. Field Service Manuals.
Ordnance stores, i.e., arms, ammunition, vehicles, harness, tools, &c.	Equipment Regs. Mobilization Store Tables, G 1098. Ordnance Manual, War. Field Service Manuals.
Clothing and necessaries	Clothing Regs. Part III. Field Service Manuals. *India.* Supply and Transport Manual, War.
Stationery	Tables of books, &c., required on mobilization. *India.* Field Service Manuals.
Medical stores	*Medical Manual, War. Field Service Manuals.
Veterinary stores	*Veterinary Manual, War. Field Service Manuals.
Food, forage and light	Supply Manual, War. War Establishments. Field Service Manuals.
Transport	War Establishments. *Transport, Remount and Veterinary Manuals, War. Field Service Manuals.

* These books are in course of preparation.

† War Establishments (Expeditionary Force) show the establishment on mobilization and are based on 1910-11 edition of Expeditionary Force War Establishments except Transport and Supply Units.

EXPEDITIONARY FORCE.

A Cavalry Division.

	*Personnel.		*Horses.			†Vehicles.						
	Officers.	Other ranks.	Riding.	Draught and Pack.	Machine Guns.	Guns.	Ammunition Wagons.	Two-horse.	Four-horse.	Six-horse.	Motor Cars.§	Bicycles.
Hd. Qrs.	31	85	59	19	..	.	..	1	2	..	16	12
4 Cavalry Brigades ..	390	6468	6184	1086	24a	..	..	24	20b	..	..	120
Hd. Qrs. Cav. Divl. Art ..	3	17	14	4	..	..	..	..	1	..	..	3
2 R.A. Brigades	88	1634	584	1050	..	24	72	32	12	48	..	8
Hd. Qrs. Cav. Divl. Eng.	4	11	6	5	..	..	..	2	..	..	..	1
4 Field Troops c	12	324	164	160	..	..	..	4	12	12	..	4
1 Wireless Telegraph Coy.	6	132	46	98	..	..	..	10	1	5	..	4
Cavalry Train	31	499	74	268	..	..	..	35	40	..	5	37
4 Cav. Field Ambulances	24	440	44	382	..	..	..	40	8	16	..	8
Total	468	9910	7125	2830	24	24	72	138	284	81	20	197

* Excluding details at base, but including details attached.
§ Officers of the A.M. Reserve provide their own motor cars and bâtmen, the latter being included in personnel shown.
a With tripod in limbered G.S. wagons with 4 horses each
b Includes the limbered G.S. wagons in (a).
c For bridging material see p. 105.
† Four tool carts with each Field Troop are shown as two vehicles.

Headquarters of a Cavalry Division is as follows:—

Commander.

Major-General.

Personal Appointments

2 A.D.C.'s.

Staff.

1 Gen. Staff Officer, 1st Grade
1 " " " 2nd "
1 " " " 3rd "
1 A.A. and Q.M.G.
1 D.A.A. and Q.M.G.
1 D.A.Q.M.G.

1 Signalling Officer.
~~1 Administrative M.O.~~
~~1 Medical and Sanitary Officer.~~
1 Administrative Vety. Officer.
1 Veterinary Officer.

1 Divisional Ordnance Officer.
1 A.P.M.
*15 Army Motor Reserve Officers.
§ Signallers, M.M.P., Clerks, Army Post Office Corps, Bâtmen, &c.

† Commands B.A.M.C. of Cav. Div.
* Assistant to A.M.O.
§ Assistant Director of Veterinary Services.

A CAVALRY [redacted]

	*Personnel.		*Horses.			Vehicles.		
	Officers.	Other Ranks.	Riding.	Draught and Pack.	Machine Guns.	Two-horse.	Four-horse.	Bicycles.
Hd. Qrs.	5	33	31	4	..	..	1	6
3 Cavalry Regiments ..	75	1584	1515	255	6a	6	515	24
Total	80	1617	1546	259	6a	6	516	30

* Excluding details at base, but including details attached.
a With tripod in limbered G.S. wagons with 4 horses each.
b Includes the limbered G.S. wagons in (a).

Headquarters of a Cavalry Brigade is as follows:—

Commander.

Brigadier-General.

Personal Appointment.

1 A.D.C.

Staff.

1 B.-M.
1 Staff captain.

Signalling Officer, Signallers, Clerk, M.M.P., Army Post Office Corps, Bâtmen, &c.

A MOUNTED BRIGADE.

	Detail.	*Personnel. Officers.	*Personnel. Other Ranks.	*Horses. Riding.	*Horses. Draught and Pack.	18-prs.	Machine Guns.	Vehicles. 2-horsed.	Vehicles. 4 horsed.	Vehicles. 6-horsed.	Vehicles. Motor Cars.(c)	Vehicles. Bicycles.
	Mounted Brigade with 2 Cavalry Regiments and 1 Mounted Infantry Battalion.											
1	Head-Quarters	8	36	31	4	..	..	..	1	..	3	9
2	Cavalry Regiments	50	1,056	1,010	170	..	4a	4	34b	..	..	16
1	Horse Artillery Battery ..	7	215	106	137	6	..	2	3	12	..	1
1	Mounted Bde. Ammn. Coln. ..	2	116	24	123	..	..	4	2	16	..	1
1	Mounted Infantry Battalion ..	35	527	501	90	..	3a	2	18	..	..	8
1	Mounted Bde. Train	6	108	16	52	..	..	5	9	..	1	9
1	Cavalry Field Ambulance ..	6	110	11	58	..	..	10	2	4	..	2
	Total	104	2,168	1,699	434	6	6	37	69	33	4	46
	Mounted Brigade with 1 Cavalry Regiment and 2 Mounted Infantry Battalions.											
1	Head-Quarters	8	36	31	4	..	..	..	1	..	1	6
1	Cavalry Regiment	25	538	555	85	..	2a	2	17b	..	..	8
1	Horse Artillery Battery ..	7	215	106	137	6	..	2	3	12	..	1
1	Mounted Bde. Ammn. Coln. ..	2	116	24	123	..	..	4	2	16	..	1
2	Mounted Infantry Battalions ..	50	1,054	1,002	180	..	4a	4	35b	..	..	16
1	Mounted Bde. Train	6	108	16	52	..	..	5	9	..	1	9
1	Cavalry Field Ambulance ..	6	110	11	58	..	..	10	2	4	..	2
	Total	104	2,167	1,695	689	6	6	37	70	32	4	43

* Excluding details at base, but including details attached.
(a) With tripod in limbered G.S. wagons with 4 horses each.
(b) Includes the limbered G.S. wagons in (a).
(c) Officers of the Army Motor Reserve provide their own motor cars and bâtmen, the latter being included in personnel shown.

Headquarters of a Mounted Brigade is as follows:—

Commander.

Brigadier-General.

Personal Appointment.

1 A.D.C.

Staff.

1 B.M.
1 Staff Captain.

1 Signalling Officer, 3 Army Motor Reserve Officers, Signallers, M.M.P., Clerk, Army Post Office Corps, Bâtmen, &c.

A Division, Forming Part of an Army.†

——	*Personnel.		*Horses.		Machine Guns.	Vehicles.						
	Officers.	Other Ranks.	Riding.	Draught and Pack.		Guns.	Ammunition Wagons.	Two-horse.	Four-horse.	Six-horse.	Motor Cars. §	Bicycles.
Hd. Qrs.	20	77	56	12	..	..	..	1	2	..	4	8
3 Infantry Brigades ..	360	12069	161	768	24c	..	..	147df	54	..	..	63
Hd. Qrs. Divl. Art. ..	4	20	20	4	..	..	..	..	1	..	..	2
3 F.A. Brigades	75	3817	634	2253	..	54	162	39	33	90	..	12
1 F.A. Howitzer Brigade (3 Batts. 5in.)	18	535	141	363	..	12	24	5	8	12	..	3
1 F.A. Howitzer Bde. (3 Batts., 4·5in.)	*24*	*822*	*195*	*612*	..	*18*	*54*	*6*	*10*	*12*	..	*4*
Heavy Battery and Ammn. Column.. ..	6	224	36	151‡	..	4b	12	2	12	..	..	1
Divisional Ammn. Column (if 5in. Howr.) ..	20	807	71	973**	..	..	..	3a	20	133	..	5
Divisional Ammn. Column (if 4·5in. Howr.) ..	*20*	*780*	*71*	*933***	..	..	..	3a	20	*127*	..	*5*
Hd. Qrs. Divl. Eng. ..	4	11	8	4	..	..	..	3a	..	..	..	1
2 Field Companies e ..	12	418	32	114	..	..	..	26	2	6	..	2
1 Divisional Telegraph Coy.	2	59	21	20	..	..	..	3	3	..	..	1
2 Mounted Infantry Cos.	12	318	308	40	..	..	..	..	8	..	..	4
Divisional Train	26	448	62	343	..	..	..	38a	41	..	4	30
3 Field Ambulances ..	30	723	42	352	..	..	..	18	48	..	..	8
Total (with 5in. Howr.)	589	18522	1076	5197	24	70	198	274	233	341	8	136

† When acting independently, 1 G.S.O. 3rd Grade, with 3 horses and 2 bâtmen, will be added.

* Excluding details at base, but including details attached.

§ Officers of the A.M. Reserve provide their own motor cars and bâtmen, the latter being included in personnel shown.

‡ Includes 133 heavy draught.

** Includes 28 heavy draught.

a Includes 1 1-horse.

b With 8 horses each.

c With tripod in limbered G.S. wagons with 2 horses each.

d Includes 12 1-horse.

e A Field Company consists of Headquarters and 4 sections For bridging material see p. 105.

f Includes the limbered G.S. wagons in (c).

Headquarters of a Division is as follows:—

Commander.

Lieutenant or Major-General.

Personal Appointments.

2 A.D.C.'s.

Staff.

1 General Staff Officer, 1st Grade.
1 " " " 2nd "
1 " " " 3rd "
1 A.A. and Q.M.G.
1 D.A.A. and Q.M.G.
1 D.A.Q.M.G.

---

1 Signalling Officer.
1 Administrative M.O.*
1 Medical and Sanitary Officer.†
1 Administrative Vety. Officer.‡
1 Veterinary Officer.
1 Divisional Ordnance Officer.

1 A.P.M.
4 Army Motor Reserve Officers
Clerks, Police, Bâtmen, Signallers, Army Post Office Corps, &c.

* Commands R.A.M.C. of Division.
† Assistant to A.M.O.
‡ Assistant Director of Veterinary Services.

AN INFANTRY BRIGADE

	*Personnel.		*Horses.		Machine Guns.	Vehicles.		
	Officers.	Other ranks.	Riding.	Draught and Pack.		Two-horse.	Four-horse.	Bicycles.
Hd. Qrs.	4	48	15	12	..	1	2	1
4 Infantry Bns.	116	3,990	40	244	8a	495, c	16	20
Total	120	4,038	55	256	8a	496, c	18	21

* Excluding details at base, but including details attached.
(a) With tripod in limbered G.S. wagons with 2 horses each.
(b) Includes 4 1-horse.
(c) Includes the limbered G.S. wagons in (a).

Headquarters of an Infantry Brigade is as follows:—

Commander.

Brigadier-General.

Personal Appointment.

1 A.D.C.

Staff.

1 B.M.

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1 Sig. Officer, Signallers, Telephone Detachment of 2 Sections, M.M.P., Clerk, Army Post Office Corps, Bâtman, &c.

GENERAL COMPOSITION OF ARMY TROOPS. ONE OR MORE OF THE FOLLOWING UNITS AS REQUIRED.

General headquarters.
Headquarters of an army.
A mounted brigade.
A squadron of Irish horse.
A signal company (cable).
A signal company (air-line).
A balloon company.
A bridging train. (For material carried see p. 105.)
An infantry battalion.
An army troops train.
A field ambulance.

* DETAILS OF ROYAL ARTILLERY.

—	Personnel.		Horses.		Vehicles.					
	Officers.	Other ranks.	Riding.	Draught and Pack.	Guns.	Ammunition Wagons.	Two-horse.	Four-horse.	Six-horse.	Bicycles.
A H. A. Bde. (13-pr.):—										
Hd. Qrs.	5	341†	25	9†	..	..	2†	1	..	1
3 Batts. (each)	5	203	100	134	6	12	1	..	3	1
Ammn. Coln.	4	227	42	248	..	12	7	5	20	1
Total	19	667	267	535	12	36	11	6	24	4
A F. A. Bde. (18-pr.):—										
Hd. Qrs.	5	341†	21	9†	..	..	2†	1	..	1
3 Batts. (each)	5	198	50	130	6	15	1	2	..	1
Ammn. Coln.	5	311	37	352	..	18	8	4	30	..
Total	35	839	208	751	18	54	13	11	30	4
A F. A. (5in. Howr.) Bde.:—										
Hd. Qrs.	5	331†	21	9†	..	..	2†	1	..	1
2 Batts. (each)	5	185	48	110	6	9	1	2	..	1
Ammn. Coln.	3	138	24	134	..	6	1	3	12	..
Total	18	583	141	303	12	24*	5	8	12	2
A F.A. (4·5in. Howr.) Bde.:—										
Hd. Qrs.	5	84	21	9†	..	..	2	1	..	1
3 Batts. (each)	5	196	50	150	6	12	1	2	..	1
Ammn. Coln.	4	194	28	213	..	18	1	3	12	..
Total	24	532	199	612	18	54	6	10	12	4
A Heavy Artillery Batt. and Ammn. Coln.:—										
1 Batt.	5	165†	52	96b†	4a	8	2†	4	..	1
Ammn. Coln.	1	58	4	55c	..	4	..	8	..	..
Total ...	6	224	56	151	4	12	2	12	..	1

* Excluding details at base, but including details attached.
† Includes personnel, horses and cable cart for telephone detachment.
a With 8 horses each.
b Includes 83 heavy draught.
c " 50 " "

* Details of Royal Artillery—*continued.*

	Personnel.		Horses.		Vehicles.					
	Officers.	Other ranks.	Riding.	Draught and Pack.	Guns.	Ammunition Wagons.	Two-horse.	Four-horse.	Six-horse.	Bicycles.
II. A. Battery with Mounted Brigade :—										
1 Batt.	7	215‡	106	187	6	12	2	3	...	1
Ammn. Coln.	2	116	24	123	...	6	4	2	10	1
Total...	9	331	130	310	6	18	6	5	10	2
A Siege Artillery Brigade (Heavy) :—										
Hd. Qrs.	3	13	7	...	...	...	...	...	...	...
2 Batts. (each)	5	124	2	...	...	...	...	...	...	...
Total...	13	261	11	...	...	...	...	...	...	...
A Siege Artillery Brigade (Medium) (6-in. Howr.) :—										
Hd. Qrs.	4	31	8	4	...	...	30	...	...	...
4 Batts. (each)	5	181	17	944	4a	...	3	12	...	...
2 Ammn. Colns. (each)...	3	106	13	78e	...	...	1	17	...	...
Total...	30	957	109	530	16	...	16	82	...	...
A Divisional Ammn. Coln. (if 5in. Howr.) :—										
Hd. Qrs.	4	22	11	10	...	...	30	1	...	1
3 Sections (each) c ...	4	195	15	238	...	...	...	3	31	1
4th Section c	4	200	15	249d	...	...	...	10	31	1
Total...	20	807	71	973	...	...	3	20	133	5
A Divisional Ammn. Coln. (if 4·5in. Howr.) :—										
Hd. Qrs.	4	22	11	10	..	..	30	1	..	1
3 Sections (each) c ..	4	195	15	238	..	..	..	3	31	1
4th Section c	4	173	15	259d	..	..	..	10	35	1
Total	20	790	71	933	..	..	3	20	137	5

* Excluding details at Base, but including details attached.
‡ Includes personnel for telephone detachment.
a With 8 horses each.
b Includes one 1-horse.
c The 1st, 2nd, and 3rd Sections carry ammunition for 18-pr. in 60 G.S. wagons, and S.A.A. in 42 G.S. wagons. The 4th Section carries ammunition for 15-pr. in 6 G.S. wagons, for 5" howitzers in 24 G.S. wagons or for 4·5" howitzers in 18 G.S. wagons, and for 60-pr. in 7 G.S. wagons with 1 G.S. wagon for S.A.A.
d Includes 28 heavy draught.
§ Includes 79 heavy draught.
e Includes 71 heavy draught.

* Miscellaneous Details.

—	Personnel.		Horses.		Vehicles.				
	Officers.	Other ranks.	Riding.	Draught and Pack.	Two-horse.	Four-horse.	Six-horse.	Bicycles.	Motor Cars.
1 Squadron Cavalry ...	6	158	155	20	...	4	...	2	...
1 Squadron Irish Horse ...	6	159	155	30	...	4	...	2	...
1 Company Infantry ...	3	117	...	2	...	...	...	1½	...
1 Company M.I.†	6	157	154	20	...	4	...	2	...
Signal Company (Cable)...	6	179	61	54	11	9	—	1	...
Signal Company (Air-Line)	6	220	52	106	4	13	6	1	...
Balloon Company... ...	3	65	8	41	1	8	1	1	...
A Bridging Train‡ ...	7	227	45	286	24	4	40	1	...
A Cavalry Field Ambulance (2 secs.)b (50 patients)	8	110	11	58	10	2	4	2	...
A Fd. Ambulance (3 secs.)c (150 patients) ...	10	241	14	84	6	16	...	1	...
A Cavalry Train (5 Cos A.S.C.) :—									
Hd. Qrs. and Hd. Qr. Co.	11	127	22	69	16	8	...	9	1
Other Companies (each)	5	93	13	46	5	8	...	7	1
Total	31	499	74	253	35	40	...	67	5
A Divl. Train (4 Cos. A.S.C.) :—									
Hd. Qrs. and Hd. Qr. Co.	11	160	23	90	13d	14	...	9	1
Other Companies (each)	5	96	13	51	5	9	...	7	1
Total	26	448	62	243	28	41	...	30	4

* Excluding details at base but including details attached.

† When not employed as Divisional Mounted Infantry.

‡ For bridging materials see p. 105.

a Includes one 1-horse cart.

b Each section consists of a bearer sub-division and a tent sub-division. The transport is equally divided between the sections.

c Each section consists of a bearer sub-division and a tent sub-division. The transport is equally divided between the sections, except that one section has 4 ambulance wagons, whereas the other two sections have 3 each.

d One per two companies.

*Other Units.

—	Personnel.		Horses.		Vehicles.			
	Officers.	Other Ranks	Riding.	Draught and Pack.	Guns.	Two-horse.	Four-horse.	Six-horse.
Head Quarters:—								
Of a Post on L. of C. with Small Rest Camp	3	6	2	...	...	...	...	...
Of a Large Rest Camp ...	2	5	2	...	...	...	...	...
Of an Infantry Base Depôt (for the Infantry of 1 Division) ...	2	5	1	...	...	...	...	...
Of a General Base Depôt (for 1 Division and a Cavalry or Mounted Brigade) a	2	5	1	...	...	...	...	...
Works Company	7	159	5	...	...	...	...	...
Telegraph Co. on L. of C.	4	174	4	...	...	...	...	...
Railway Transport Establishment	7	17	...	...	...	...	...	...
Railway Company	7	346	2	3	...	1	...	...
Central Railway Establishment	39	350	...	...	...	...	...	...
Railway District	12	252	...	...	...	...	...	...
Cleaning Hospital (200 sick)	8	77	8	should transport be required it will be furnished under orders of the I.G.C.				
†Stationary Hospital (200 beds)	8	80	3					
‡General Hospital (520 beds)	21	143	3	should transport be required it will be furnished under orders of the I.G.C.				
A Convalescent Depôt ...	3	3	...	...	...	...	...	...
Ambulance Train	2	18	...	(attached 2 nursing sisters).				
Hospital Ship (320 beds) ...	6	38	...	attached stewards, washermen, and 9 Q.A.I.M.N.S.				

* Excluding details at base but including details attached.

† The above establishment of a Stationary Hospital is applicable to Scale A of Q.A.I.M.N. Service. Should Scale B be ordered, 9 nursing section orderlies will be added, the 2 bâtmen and 1 cook for female nursing staff being deducted.

‡ The above establishment of a General Hospital is applicable to Scale A of Q.A.I.M.N. Service. Should Scale B be ordered, 5 N.C.O.'s for ward duties and 30 nursing section orderlies will be added, the 4 bâtmen and 1 cook for female nursing staff being deducted.

a Details left at the base, except orderly-room serjeants or senior clerks, by units of Cavalry, Artillery, Engineers, Mounted Infantry and R.A.M. Corps are attached to this unit. A.S.C. details are attached to the Base Transport Depôt.

OTHER UNITS—*continued.*

	Personnel.		Horses.		Vehicles.								
	Officers.	Other ranks.	Riding.	Draught and Pack.	Lorries.	Tractors.	Two-horse.	Four-horse.	Trucks.	Trailers.	Motor Cars.	Motor Cycles.	Bicycles.
Advanced Depôt Medical Stores	1	5	1	...	...	...	...	...	...	...	...	...	...
Base Depôt Medical Stores...	2	8	...	...	...	...	...	...	...	...	...	...	...
Sanitary Section	1	25	1	...	...	...	...	...	...	...	...	...	...
Sanitary Squad	...	6	...	...	...	...	...	...	...	...	...	...	...
Depôt Unit of Supply ...	1	13	...	...	...	...	...	...	...	...	...	...	...
Bakery Section *b*	...	15	...	...	...	...	...	...	...	...	...	...	...
Cavalry Supply Column ...	6	394	...	...	78*c*	4	...	...	4	4	2	4	15
Divisional Supply Columns ...	5	269	...	...	37*d*	2	...	...	2	2	2	2	11
Army Troops Supply Column	5	320	...	...	61*c*	3	...	...	3	3	4	2	15
Reserve Park (4-horsed wagons)	7	451	21	674	...	...	3*a* 152	...	...	...	...	...	...
Reserve Park (2-horsed wagons)	7	261	19	340	...	...	155*a*	...	...	...	...	...	...
Railway Supply Detachment	1	61	...	...	...	...	...	...	...	...	...	...	...
Advanced Horse Transport Depot	5	59	...	...	...	...	...	...	...	...	...	...	...
Base Horse Transport Depot	3	76	...	...	...	...	...	...	...	...	...	...	...
Advanced Mechanical Transport Depot	5	134	...	...	...	...	...	...	...	...	...	...	...
Base Mechanical Transport Depot	7	91	...	...	...	...	...	...	...	...	...	...	...
Field Bakery	1	93	...	...	...	...	...	...	...	...	...	...	...
Field Butchery	1	20	...	...	...	...	...	...	...	...	...	...	...
Base Remount Depôt (1,000 horses)	11	377	355	650	...	...	4	...	...	...	...	...	...
Advanced Remount Depôt (300 horses)	4	112	105	300	...	...	2	...	...	...	...	...	...
A Veterinary Section (for 250 sick horses)	2	113	11	...	...	...	...	...	...	...	...	...	...
Base Depôt of Veterinary Stores	1	7	...	...	...	...	...	...	...	...	...	...	...
An Ordnance Depôt Unit ...	2	69	1	...	...	...	...	...	...	...	...	...	...
A Base Accounts Unit ...	43	181	...	...	...	...	...	...	...	...	...	...	...
A Base Post Office	5	80	...	...	...	...	...	...	...	...	...	...	...
An Advanced Base Post Office	...	6	...	...	...	...	...	...	...	...	...	...	...
A Stationary Post Office ...	...	4	...	...	...	...	...	...	...	...	...	...	...
A Survey Section	2	19	5	5	...	...	3*a*	...	...	...	...	...	...

a Includes one 1-horse.

b A bakery section comprises 8 ground ovens capable of baking 4,320 bread rations in 12½ hours. These ground ovens will gradually be replaced by 2 travelling ovens, which will bake up to 5,000 bread rations in 12 hours.

c 30-cwt. lorries.

d 3-ton lorries.

INDIA.

Cavalry Brigade

Establishment.

Detail.	British.			Indian.				Animals.		Ordnance.				Remarks.
	Officers.	Other Ranks.	Total.	Ranks.	Followers. Public.	Followers. Private.	Followers. Total.	Horses.	Others.	Field Guns.	Wagons.	Maxim Guns.	Rifles.	
Headquarters*	8	7	15	7	2	26	35	32	...	...	...	...	...	* Includes post office, 2nd class.
1 Horse Artillery Battery	6	171	176	16	33	15	64	230	1	6	14	...	48	
1 British Cavalry Regiment ...	28	450	478	...	50	66	116	548	1	...	...	2	421	
3 Indian Silladar Cavalry Regiments	36	...	36	1,602	206†	84	1,292	1,040	18‡	...	...	4	982	† 116 of these are 1st line transport personnel.
Field Troop, R.E.§	1	2	3	47	23	2	72	51	1	...	...	...	45	‡ Includes 16 riding camels.
Cavalry Brigade Ammunition Column	2	17	19	62	18	4	85	108	...	...	45	...	10	§ Figures are approximate only. Includes 5 park horses.
1 Sect Cavalry Field Ambulance (British)	1	6	7	1	50	7	58	1	4	...	...	...	...	Exclusive of British and Indian personnel and includes 42 Transport personnel for carts with S.A.A.
3 Sects Cavalry Field Ambulance (Indian)	2	1	4	11	78	12	101	2	6	...	...		...	
Brigade Supply Column ¶	...	1	1	4	20	2	26	...	1	...	...	...	...	¶ Establishment for Supply Columns is still under discussion.
Total	73	655	728	1,151	480	218	1,849	1,973	32	6	59	6	1,456	
				1,879				2,004						

A Cavalry division is not permanently organized, but arrangements and tables exist for a division of 2, 3 or 4 brigades. he divisional troops are formed by massing the artillery, engineers, etc., of the brigades.

DIVISION (COMPOSED OF MIXED BRIGADES)

Establishment

Detail.	British.			Indian.				Animals.				Ordnance.				
					Followers.											
	Officers.	Other Ranks.	Total.	Ranks.	Public.	Private.	Total.	Horses.	Ponies.	Ordnance Mules.	Other Mules.†	Field Guns.	Mountain Guns.	Vehicles.	Machine Guns.	Rifles or Carbines.
Headquarters*	19	19	38	37	7	56	100	46	6	...	...		...	...	...	...
3 Mixed Infantry Brigades	219	2,409	2,628	6,795	657	480	7,932	189	12	...	144	...	...	...	24	9,129
1 Indian Cavalry Regiment	13	...	13	501	103	42	646	520	1	...	...	...	...	...	2	466
1 Battalion, Pioneers	13	...	13	773	64	33	850	14	1	...	42	...	...	...	12	735
Headquarters, Field Artillery Brigade	9	11	13	...	...	1	4	5	13	...	...	...	...	...	...	...
3 Batteries, Field Artillery	15	513	528	39	99	45	183	534	3	...	...	18	...	42	...	144
2 Batteries, Mountain Artillery (British)	10	226	236	354	72	30	456	14	14	248	...	...	12	...	...	164
Divisional Ammunition Column ...	5	68	73	239	30	15	284	336	1	...	...	...	...	289	...	74
Divisional Engineers' Headquarters ...	4	1	5	...	...	13	13	8	1	...	...	...	...	...	...	...
2 Field Companies, Sappers and Miners	8	4	12	389	34	30	450	10	6	...	30	...	...	...	...	374
2 British Field Ambulances ...	8	42	50	4	382	42	434	8	20	...	...	...	...	...	...	...
3 Indian Field Ambulances	12	3	15	66	471	63	600	12	30	...	...	...	...	...	...	...
Divisional Supply Column	7	17	24	4	213	38	254	7	32	...	...	...	...	...	...	...
Total	335	3,373	3,708	9,168	2,132	901	12,197	1,711	127	848	222	18	12	331	28	11,096
			12,870					1,838		570						

* Includes F.P.O., 1st class.

† The term "other mules" includes maxim and equipment mules of infantry and engineer units.

INDIA—*continued*

MIXED INFANTRY BRIGADE.

Establishment

Detail.	British.			Indian.				Animals.		Ordnance.	
					Followers.						
	Officers.	Other Ranks	Total.	Ranks.	Public.	Private.	Total.	Horses and Ponies.	Others.‡	Maxim Guns.	Rifles.
Headquarters*	5	7	12	7	2	14	23	10	...	...	...
1 British Infantry Battalion	33	810	843	...	63	47	110	12	12	2	838
3 Indian Infantry Battalions	901	...	90	2,208	156	99	2,463	45	36	6	2,205
Total	124	823	947	2,215	221	160	2,596	67	48	8	3,043
			3,162								

* Includes 2nd class Field P.O. † Includes 51 Indian Officers.
‡ Includes Ordnance or 1st line equipment mules.

HOMOGENEOUS BRITISH INFANTRY BRIGADE.

Establishment.

Detail.	British.			Indian.				Animals.		Ordnance.	
					Followers.						
	Officers.	Other Ranks.	Total.	Ranks.	Public.	Private.	Total.	Horses and Ponies.	Others †	Maxim Guns.	Rifles.
Headquarters*	5	7	12	7	2	14	23	10	...	...	...
4 British Infantry Battalions	116	3,264	3,380	...	252	188	440	48	48	8	3,352
Total	121	3,271	3,392	7	254	202	463	58	48	8	3,352
			3,399								

* Includes 2nd class Field P. O.

† Includes Ordnance or 1st line equipment mules.

INDIA —*continued*

DETAILS OF ROYAL ARTILLERY UNITS.

Details.	Personnel.		Animals		Vehicles.					Remarks.
	Officers.	Other ranks.	Riding Horses.	Draught and Pack.*	Guns.	Ammunition Wagon	Two-horse.	Four-horse.	Six-horse.	
Horse Artillery Battery	5	187	98	303	6	12	.	...	2	
Horse Artillery Brigade with Ammunition Column.	14	531	219	615	14*	36	.	20	1	*Including 2 spare gun carriages
Field Artillery Brigade	17	563	163	507	18	36	...	6	...	
Field Artillery Howitzer Brigade with Ammunition Column.	21	736	167	708	19*	54	...	...	9	*Including 1 spare gun carriage.
British Mountain Battery.	5	290	7	244	6	...	...	...	...	
Indian Mountain Battery	5	290	7	245	6	...	...	...	...	
Heavy Battery with Ammunition Column.	6	319	13	353	5*	36	..	...	...	*Including 1 spare gun carriage.
Heavy Battery partly horsed with Ammunition Column.	6	199	24	276	5*	20	...	...	...	*Including 1 spare gun carriage.
Divisional Ammunition Column	5	307	20	301	3	247†	..	30	...	Re-organization under consideration.
Howitzer Brigade Ammunition Column.	4	180	20	243	...	27	...	...	(a)4	(a) 1 Gun-carriage.

* Draught and pack includes—
Ponies.
Draught horses
.. mules.
Pack mules and camels.

† Includes 229 ammunition mule carts.

INDIA—*continued.*

OTHER UNITS.

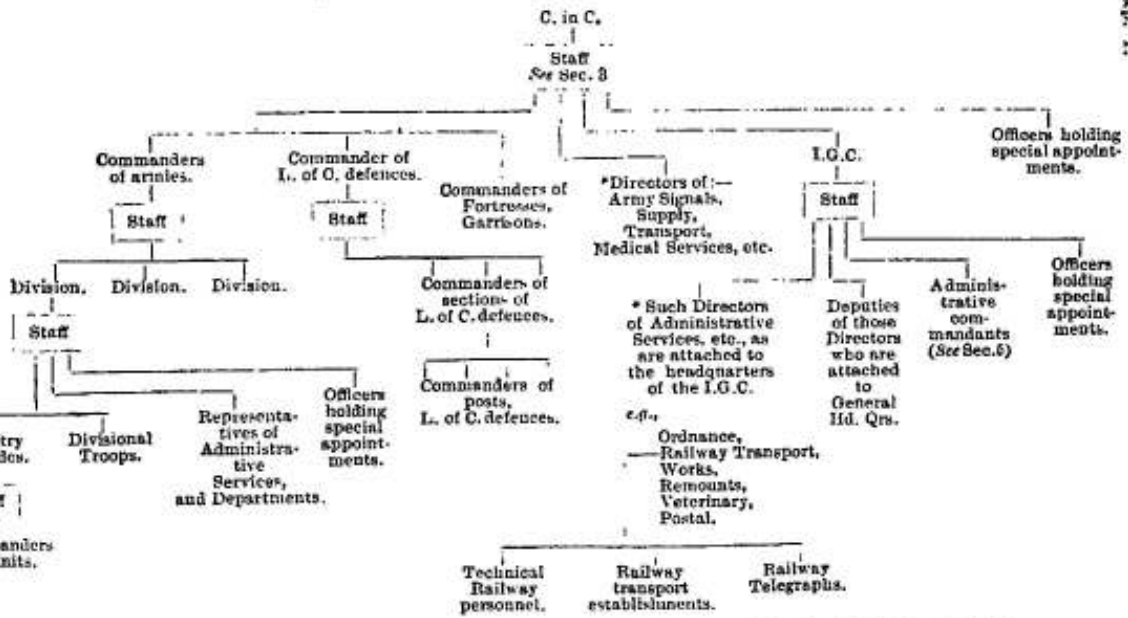
Details.	Personnel. Officers.	Personnel. Other ranks.	Animals. Riding Horses.	Animals. Draught and Pack.	Remarks.
One squadron. British Cavalry ..	6	169	122	*53	* Includes 1 horse for entrenching tools.
One squadron. Indian Cavalry for general mobilization).	†7	117	‡128	47	† Includes 4 Indian officers.
One squadron. Indian Cavalry (for minor expeditions)	†7	117	‡128	73	‡ 2 riding camels.
One section of Field Ambulances—					
Cavalry Field Ambulance (British)§.	1	6	3	...	§ Exclusive of 50 public followers.
Field Ambulance (British)§.	1	6	3	...	
Cavalry Field Ambulance (Indian)‖.	1	7	3	...	‖ Exclusive of 73 public followers.
Field Ambulance (Indian).	1	7	3	...	
Field Post Office (1st class).	...	¶3	...	6	¶ Exclusive of four public followers.
Field Post Office (2nd class).	...	**3	...	3	** Indian subordinate and 3 public followers.
Lines of Communication	34	††21	66	...	†† Including 14 Indian clerks.
Base of Operations— Headquarters	23	‡‡14	46	...	‡‡ Includes 10 Indian clerks.
British Military Base Depot (a)	3	8	3	...	(a) Includes a base record section.
Indian Military Base Depot §§.	(b) 3	5	2	...	(b) One Indian officer. §§ Does not include base record section, not yet decided
Advance Depot Headquarters— Railhead—headquarters— Engineer Field Park ...	1	5	2	(c) 3	(c) Exclusive of 90 camels.
Ordnance units— For One Brigade— (Base Depot) (d) .	2	6	5	...	(d) Includes necessary establishment for an advanced depot if required.

INDIA—*continued.*

OTHER UNITS—*continued.*

Details.	Personnel.		Animals.		Remarks
	Officers.	Other ranks.	Riding Horses.	Draught and Pack.	
Ordnance Units—*cont.*					
For Two Brigades—(Base Depot) (*a*) ...	3	13	9	...	(*a*) Includes necessary establishment for an advanced depot if required.
For Three Brigades—(Base Depot) (*a*) ...	4	(*b*) 23	14	...	(*b*) Includes three civilian mechanics.
One Division—					
Base Depot	3	198*	21	1,613	* Includes public followers and attached Supply and Transport personnel.
Intermediate Depots		34*	2	...	
Repair Train	1	35*	1	...	
Ambulance Column—for minor expeditions—					
Collecting Section ...	1	4	3	...	
Staging Section ...	1	2	(*c*) 3	...	(*c*) Exclusive of riding and pack mules and A.T. bullocks.
Ambulance Column—For general mobilization—					
Collecting Section ...	1	4	3	...	
Staging Section ...	1	2	(*c*) 3	...	
A Sanitary Section ...	1	21	1	...	

2. SYSTEM OF COMMAND IN THE FIELD.



The offices of directors of administrative services will be located as directed by the C. in C. *See* F.S. Regs. II 23, (7).

3. GENERAL ORGANIZATION AND FUNCTIONS OF THE STAFF.

The Staff is organized in three branches:—

I. The General Staff branch.
II. The A.G.'s. branch.
III. The Q.M.G.'s branch.

For the efficient performance of staff duties all three branches must work in close co operation.

The General Staff are responsible that, with due regard to secrecy, information as to situation and probable requirements of troops is furnished to administrative services and departments in sufficient time to enable these requirements to be met.

The following table shows the distribution of duties amongst the three branches:—

Chief of the General Staff * or
Senior General Staff Officer of a Command.

General Staff Branch.

Co-ordination of staff work as far as this power is delegated by the Commander.

Advice on all matters affecting military operations.

Signing and issue of all orders by the Commander.

Responsibility for the working out of all arrangements, and for the drafting of detailed orders regarding:—

All military operations, including embarkations and landings in co-operation with the Navy within the theatre of operations.
War organization and efficiency of the troops.
Selection of lines of operations.

Adjutant-General's Branch.

The duties include:—

Discipline.
Application or interpretation of military, martial and international law.
Executive duties connected with the appointment and promotion of officers.
Questions relating to the supply of military personnel to the army: interior economy, personal services, pay, promotion, honours and rewards, enlistments and applications of all kinds concerning the fighting troops; spiritual welfare of the army.
Medical and sanitary services, including provision of medical stores.
Casualties and invaliding.
Organization and mobilization of improvised units.

Quartermaster-General's Branch.

The duties include:

Embarkations and landings outside the theatre of operations.
Distribution, in detail, of quarters and buildings within the areas delimited by the General Staff.
Questions concerning:—
Supplies.
Equipment, clothing and stores of all kinds (except provision of medical stores).
Land, inland water and sea transport.
Railway administration.
Remounts.
Veterinary.
Postal.
Preparation of reports, despatches and diaries relative to the above.

All plans for the concentration, distribution and movement of troops and matériel by rail, road or inland waterways in the theatre of operations.
Selection of areas within which units or formations may be quartered, security, marches, and battle.
Intercommunication in the field.
Special reconnaissances.
Policy connected with raising new units.
Provision of guides and interpreters.
Acquisition and distribution of information about the enemy, the country and its resources.
Questions of policy in dealing with the civil population.
Flags of truce and correspondence with the enemy.
Censorship over communications, *i.e.*, the post, telegraphs, telephones and cables.
Control of the press and press correspondents.
Secret services, ciphers, care and disposal of captured documents.
Provision, distribution and revision of maps.
Charge of foreign attaches.
Preparation of reports, despatches, and diaries relating to the above.
Responsibility that administrative services and departments are furnished with constant and accurate information as to the situation and probable requirements of the troops.
Advice as to movements or disposal of all impedimenta, including supply columns and parks and L. of C. units when the military situation requires it.

Police and sanitary measures.
Disposal of prisoners of war.
Burying parties and places.
Routine garrison or camp duties.
Ceremonial.
Preparation of reports, despatches and diaries relative to the above.
Drafting all orders, regarding these duties, for insertion in operation orders.
Signature and issue of all routine orders and instructions connected with above duties

Subject to tactical considerations the co-ordination of all administrative arrangements between the I.G.C. and commanders of field units or formations.
Drafting all orders regarding these duties for insertion in operation orders.
Signature and issue of all routine orders and instructions connected with above duties.

* The power and responsibility of co-ordinating staff work at general headquarters is vested in the C.-in-C.; but he will delegate it as he may think fit to the C.G.S., who is his responsible adviser on all matters affecting military operations, through whom he exercises his functions of command, and by whom all orders issued by him will be signed. Subordinate commanders will exercise their functions of command and issue their orders through their senior general staff officer on similar principles.

4. DISTRIBUTION OF DUTIES AMONG ADMINISTRATIVE SERVICES AND DEPARTMENTS, AND BRANCH OF THE STAFF RESPONSIBLE FOR THE ISSUE OF INSTRUCTIONS.

G.S. Branch.	A.G.'s Branch.					Q.M.G.'s Branch.						
Director of Army Signals.	Director of Medical Services.	Deputy Judge-Advocate General.	Principal Chaplain.	Provost Marshal.	Director of Supplies.	Director of Ordnance Services.	Director of Transport.	Director of Railway Transport.	Director of Works.	Director of Remounts.	Dir. of Veterinary Services	Director of Postal Services.
Organization and maintenance of a means of intercommunication, including visual, electrical, and mechanical, and despatch riders in the theatre of operations.	Care of sick and wounded. Provision and administration of hospitals and convalescent depots. Provision of medical stores. Recommendations for preserve health and prevent disease in the army and civil population. Subject to balancing, control of medical equipment and readiness of hospital ships for invalids.	Represents J.A.G. Advises on matters of military, military, Provision of martial law.	Spiritual administration and welfare of the army.	Commands the corps of military police and is responsible for their organization, efficiency and distribution.	Provision and administration of all food, fuel, light and disinfectants.	Provision and administration of equipment, clothing, and stores of all kinds other than medical and veterinary stores. Provision of technical vehicles of Artillery and Engineer units.	Provision, administration and distribution of all transport except technical vehicles of Ordnance Services, excluding railway and sea transport, but including inland water transport.	Provision and administration of railway transport, Control, construction, working and maintenance of all railways. Provision of telegraph operators for railway circuits. Control and work-ing of telephones and telegraph allotted to the railway service.	Provision, construction and maintenance of buildings, offices, stores, camping grounds, roads, etc., on the L. of C. Provision of water supply, gas, electric light-ing, or other technical plant required for military purposes on L. of C. and not provided by other services.	Provision, construction, maintenance, training and distribution of all animals.	Veterinary care and inspection of all animals. Provision of veterinary stores.	Provision and administration of all postal communications.

NOTE.—Directors and heads of administrative services and departments are represented in subordinate commands by one or more assistants. Where no assistant is appointed, the senior officer of the service or department in the command is the representative of the director.

The functions and responsibilities of a representative are similar to and differ only in degree from those of a director or head who communicates directly with his representative on all matters of technical detail conected with his service.

5. ORGANIZATION AND DISTRIBUTION OF DUTIES ON LINES OF COMMUNICATION.

Inspector-General of Communications

(His headquarters are usually located at the head of the L. of C. in close proximity to General Headquarters. He receives C.-in-C.'s instructions through the G.S. or the A.G.'s or Q.M.G.'s branch of the Staff. His area of jurisdiction extends from the Base to the Refilling Points, both inclusive.)

Command of all L. of C. units (exclusive of L. of C. defence troops). Control and co-ordination of all traffic on L. of C. Organization in detail of all traffic and administrative arrangements on the L. of C. The selection, appropriation and allotment of sites and buildings for depots of all kinds, quarters, offices, hospitals, plant and material of every description required on L. of C., subject to considerations of tactical security. Supply and maintenance of garrisons and posts on L. of C. Supply and accommodation of all troops halting or moving within the area of his jurisdiction. Deciding method of transport and forwarding requirements of the forces in the field. Keeping the C. in C.'s staff informed as to the daily situation of all depots and stocks of ammunition, supplies, stores and material on the L. of C.

Members of the General Staff, A.G.'s and Q.M.G.'s branches of the Staff and Representatives of Heads of Services and Departments as required.

Base Comdt.

Administrative Section Comdt.

In direct telegraphic communication with commander of L. of C. defences and his subordinate commanders. Discipline, sanitation, interior economy and policing of the area within his jurisdiction. Transmits the orders of the I.G.C. for the movement of all personnel, animals, material, mails, etc., to the commanders of units or representatives of administrative services and departments concerned and facilitates their despatch by the railway transport establishment, communicating particulars to the adjoining commandants, if any, as to the time and place of the next halt. Details such fatigue parties as the railway transport establishment require. Receives and accommodates all personnel (including prisoners of war) and animals, on their

way to and from the front. Detains any person arriving without authority. In default of special instructions, a commandant includes within the limit of his command the line half-way to the two adjoining posts on the line.

Administrative Post Comdt.

Duties similar to those of Section Comdt. above

Director of Sea Transport.

Controls the arrangements in connection with the provision of sea transport on behalf of the Admiralty. Arranges all details of embarkations and landings in concert with the M.L.O. and Base Comdt. Notifies M.L.O. of arrival of ships. The requirements as regards sea transport for sick, prisoners, etc., are communicated to him by the I.G.C. through the M.L.O.

Military Landing Officer.

In communication with I.G.C. and D. of Sea Tpt. Arranges all details with the latter and Base Comdt., and supervises the embarkations and disembarkations of all personnel, animals and material. Boards all ships on arrival to verify contents. Issues such copies of local orders as may be necessary. Informs the D. of Sea Tpt. when and where it is most convenient, from a military point of view, to receive contents of vessels. Issues orders regarding arrangements for the same and, under instructions from Base Comdt., for forwarding them to their destinations.

Makes similar arrangements to the above in connection with re-embarkations.

Commander Base Depôt.

Under command of local Administrative Comdt., wherever located by direction of I.G.C.

Duties. Care of all baggage left by units. Forwards to units parcels received for distribution. Command of all at his depôt.

Warning the necessary personnel for drafts to the front. Responsible that they are ready to entrain, embark or march, fully clothed, armed, equipped and rationed, as ordered by I.G.C. through local Adm. Comdt.

Officer i/c Base Record Office.

Receives instructions from the A.G.'s branch of the Staff at General L. of C. Qrs. for all purposes except those of local discipline and interior economy, for which purposes he is under the local administrative comdt. wherever the record office is situated.

Duties. Verify and communicate casualties in the field, relieve units from office work, keep and transmit home war diaries and other documents of an historical nature. Has a central registry, and is divided into two branches.

6. DUTIES OF COMMANDERS OF LINES OF COMMUNICATION DEFENCES.

1. The military defence of the L. of C. is entrusted to the commander of the L. of C. defences. This officer is solely responsible to the C.-in-C. for the tactical security of the L. of C., including all personnel, animals and material comprised in them, throughout the area for which he is made responsible by the C.-in-C. and of which the limits will be notified from time to time in general orders. He is also responsible for the military government of that portion of the L. of C. which is under martial law. He is allotted a staff and a proportion of L. of C. defence troops, varying in number according to the length of the L. of C., and the military situation of the moment. Officers and men detailed for duty under him will not be removed without the authority of the C.G.S.

2. The L. of C. will usually be divided for purposes of defence into sections, each under a subordinate L. of C. defence commander, who will be responsible to the commander L. of C. defences for the security of his section. Each section may contain one or more posts. A base will usually be regarded as outside the sectional organization. Such L. of C. defence troops as are not allotted to commanders of sections or posts will be retained as a mobile reserve at the immediate disposal of the commander of L. of C. defences, and stationed at whatever point on the L. of C. is best suited to the needs of the military situation.

3. The commander of L. of C. defences should be at all times in direct telegraphic communication with the C.G.S., the I.G.C. and his own subordinates.

4. Every commander or subordinate commander of L. of C defences should have a map of the country as far as the two adjoining posts, on which should be shown the position of the changing and passing places of convoys, the position of the piquets, the place for the relief of escorts, and the places where attacks are most likely.

5. A commander or subordinate commander of L. of C. defences has no control over the movement along the L. of C. of personnel, animals or material, other than those of his own command, except in the face of imminent danger from the enemy. In the latter event he is responsible that traffic is stopped until, in his opinion, it may safely be resumed, or until orders from superior authority are received. The action taken will in all cases be telegraphed direct to the C.G.S. and to the I.G.C.

6. No troops or ammunition proceeding to the front are on any account to be diverted for the defence of the L. of C. unless in the opinion of the commander of the L. of C. defences, or his subordinate on the spot, the force at his disposal is insufficient to meet an impending attack by the enemy, in which case traffic will be stopped as above mentioned, and the situation reported by telegraph to the C.G.S. An officer will incur grave responsibility in taking such a step, which only extreme emergency can justify.

7. Should an officer senior in rank to a commander or subordinate commander of L. of C. defences be temporarily detained at a post or section he will in no case interfere with the defence commander of the section or post, except in the event of actual attack by the enemy, in which case the senior officer of fighting troops on the spot will assume command.

8. When armoured trains are used, their crews will form part of the troops allotted to the L. of C. defences and will come under the orders of the subordinate defence commander of the section over which they run. Railway traffic is not to be dislocated by the use of armoured trains, except in the face of imminent danger from the enemy.

CHAPTER II.

7. MARCHES AND MARCH DISCIPLINE.

I. General Rules.

1. The rate of marching throughout a column should be uniform. An irregular pace is most exhausting to the troops, especially to those in rear of the column.

If mounted troops are marching with the column, a short halt should be made half-an-hour after the start to enable them to look round their horses. Subsequent halts at intervals of about an hour should be arranged, the duration of which should be known beforehand. Mounted troops should dismount at all halts, and should lead for part of every march.

2. An average march under normal conditions for a large column of all arms is 15 miles a day, with a rest at least once a week; small commands of seasoned troops can cover 25 miles a day under favourable conditions.

3. To prevent minor checks in a column being felt throughout its length, the following distances will be maintained:—

In rear of an infantry company...			6 yards.
" "	battalion, squadron, battery, or other unit not specified here		10 "
" "	cavalry regiment or brigade R.A. ...		20 "
" "	cavalry or infantry brigade		30 "
" "	division		100 "

4. By order of the commander of the column, distances may be increased in dusty or hot weather, and reduced or omitted when marching by night and, by day, when an engagement is imminent.

The normal formations to be adopted are as follows:—

ii. *Cavalry and Mounted Infantry.*

1. When marching along a road, not more than four horses if in sections (or groups), or not more than two horses if in half sections (or files), should march abreast, including commanders, etc.

2. To avoid any increase in the lengths of columns, commanders, centre guides, etc., should march the regulation distances between units, or fill up blank files.

3. As a rule space must be left on the right flank of a column, but sometimes it may be more convenient to leave the centre of the road clear.

4. Particular care must be exercised to leave a space for other traffic when the column is halted. When in movement, space on the right or centre of the column should be left clear.

iii. *Artillery.*

1. Brigade signallers and range takers should ride three abreast at the head of the brigade to which they belong. The regulation distance between carriages should be strictly preserved.

2. Batteries should always march on the left of the road. When a halt is ordered each carriage must be drawn up at once by the roadside. Cross roads should be left clear.

3. Dismounted detachments should never march on the off-side of the carriages.

iv. *Infantry.*

1. When marching in fours not more than four men should march abreast, including commanders and supernumeraries. Bands and drums will conform.
2. Columns of fours will march on the left side of the road unless direct orders to the contrary are issued.
3. Exact distances and covering are to be maintained at all times when marching in fours; the fact of marching at ease is not to affect the relative position of men in the ranks, or that of supernumeraries or commanders, unless orders to the contrary are issued.

v. *Transport.*

1. When marching along narrow roads mounted baggage should ride two abreast in the column; dismounted baggage guards should march in fours. The regulation distances between vehicles should be strictly preserved.
2 All vehicles should march on the left of the road, and when a halt is ordered each vehicle should be drawn up at once on that side of the road. Cross roads should be left clear.

vi. *Followers.*

1. Camp followers, sutlers, civilians, etc., who accompany troops or their transport on a line of a march, must be marshalled and be made to observe the regulations laid down for infantry.
2. The following points should be attended to by all mounted men :—

(a) Rise in the stirrups, do not lean on rifle (if carried), see that the load is evenly distributed on both sides of the saddle.
(b) If possible, at some halts off-saddle or loosen girths and shift the saddle. When saddles are removed slap the backs to promote circulation and allow the horses to roll.
(c) Allow nothing to be carried beyond the authorized articles.
(d) Remember that a horse which is out of sorts may be saved by a quiet day or two with the baggage.
(e) On a night march, when hard work is expected, halt, water and feed an hour before dawn.

vii. *Watering.*

1. Take every opportunity of watering on the march. Always water before feeding, never immediately after.
2. Dismount, remove bits and loosen girths before watering.
3. Do not allow horses to go further into a pool to drink than necessary, or the water will be fouled for those coming after.
4. Do not move at a fast pace immediately after watering.
5. Select watering place with sound bottom, good approach and water at least 4 inches deep. Running water with gravelly bottom is the best. Avoid dark-coloured water.
6. Animals do not drink well in the early morning. When an early start has been made, all animals should be watered after about 3 hours' march.

viii. *Feeding.*

1. Give a small feed before a long march, however early the start may be.
2. Feed *en route* during marches over 5 hours. Remember that horses require a considerable time to consume their rations—not less than 5 hours in 24 should be allowed.
3. Remove nose bag when horse has done and let him graze if possible.

IX.—RATES OF MARCHING.

1. If mounted troops are marching independently, the quicker the march is completed within certain limits the better. The pace should be regulated to suit the ground, the men should walk and lead frequently, and should always do so when ascending or descending steep hills.
2. Rates of movement in the field are approximately as follows:—

Arm	Yards per minute	Minutes required to traverse 1 mile.	Miles per hour including short halts.
Infantry—			
Usual Pace ...	96	18	3
Mounted Troops—			
Walk	117	15	3½
Trot	235	8	7
Gallop	410	—	—
Trot and Walk ...	—	—	5

The length of a pace in slow and quick time is 30 inches.
" " " stepping out .. 33 "
" " " double time .. 40 "
" " " stepping short .. 21 "
" " " side step .. 15 "

X RATE OF MARCHING OF TRANSPORT ON A LEVEL ROAD.

Wheeled transport	2½	miles an hour.
Mule or pony cart, A.T.	2½	ditto.
Bullock cart, A.T.	1½	ditto
Camel	2	ditto
Pack mule or pony	3	ditto
Pack bullock	2	ditto.
Pack donkey	1½	ditto.
Coolie	2	ditto.
Tractors	3½	ditto.
Motor lorries	6	ditto.

These rates include short halts only.

XI. MARCHING IN FROST AND SNOW.

1. In severe frost and snow men are liable to frostbite, snow blindness and blistered faces.
2. *Cold.*—The most efficacious measure against cold is an increased issue of rations; during halts the men should not be allowed to sit down, and especially not to fall asleep. It is best not to make long halts. In the cavalry men should dismount from time to time.

3. *Frostbite.*—To preserve the feet and limbs:—

(a) Keep the feet clean, as dirty feet are more liable to perspire and are consequently more sensible to cold.

(b) Wash the feet with soap and then smear them over with some greasy substance such as unsalted grease, kerosine, etc.

(c) Wear stout roomy boots and woollen foot cloths or stockings, or the feet may be wrapped in a double set of linen footcloths, the under pair being greased.

To protect the hands and face: smear them with one of the greasy substances referred to above, wear mits or woollen gloves and ear-flaps. Men should be instructed, as soon as they feel frost-bite anywhere, to rub the part with snow at once until the colour returns, but on no account to warm it near a fire.

4 *Snow blindness.*—To prevent snow blindness wear coloured glasses; failing these, a mask with very small holes for the eyes, or the end of a pagri over them gives fair protection.

The cheeks and sides of the nose greased and covered with powdered charcoal also relieves the eyes.

5. *Face blister.*—The preventative for this is a mask of some sort or a pagri end.

xii. Care of Transport Camels.

1. Never march in the heat of the day. Camels travel best and with least fatigue, at night or the cool of the morning and evening. The whole of the marching should be done between 4 p.m. and 9 a.m.
2. Avoid keeping camels loaded up a moment longer than is necessary. Men should be trained to load and unload as quickly as possible. Loads should not be carried more than 4 hours at a stretch.
3. Great care is necessary in balancing loads carefully and packing them as securely as possible to avoid unnecessary swaying and fatigue to the animal.
4. Camels require 5-6 hours a day to graze and ruminate. Immediately after the morning march is the best time for this. The young shoots of the Camel Thorn are the best grazing. Care should be taken to detect and avoid poisonous plants, some of which are readily eaten by camels.
5. The grain ration should be given at night.
6. Camels bred in districts where water is plentiful require to be watered daily, but desert camels usually will not drink more than once in three days, and are best for fast work. Water should be given in the morning, before grazing, and no marching must be done for several hours afterwards with desert camels.
7. The backs and feet should be inspected daily after the morning march. Camelmen must do any repairs necessary to saddlery during midday halt.
8. The pace of a baggage camel is 2½, and of a trotting camel 5 miles an hour. They must not be pushed beyond these paces.
9. Grooming is not usual, but camels thrive much better if they are rubbed over daily with a piece of sacking or a whisp.

Ticks must be carefully removed daily, after the animals come in from grazing.

10. Skin disease must be constantly guarded against, and any suspicious patches, particularly between the legs, should be periodically washed with soda or wood-ashes and dressed with a mixture of sulphur and oil, or fat, 1—4. This should be issued regularly to camelmen, and a little tar may be added, if available.

xiii. Care of Transport Cattle.

1. Avoid travelling in the heat of the day. Cattle go better and with less fatigue at night. As far as possible, all journeys should be done between the hours of 4 p.m. and 9 a.m.
2. Cattle should never be driven beyond their natural, steady walk, but they will travel much faster at night than during the day, without pushing.
3. Do not march more than 4 hours at a stretch.
4. Cattle require at least 5-6 hours daily to graze and ruminate. After the morning march is the best time, or in the evening, if not marching.
5. Grain should be given at night mixed with some chaff or hay. A good man will get up once or twice during the night and give his cattle a small feed. Nothing helps so much to keep them in condition.
   Water should be given after the morning march and in the evening before starting. If possible, cattle should be grazed near water, where they can drink at will, and where grass is luxurious.
6. Ticks should be removed daily after grazing. In a badly-infested country ticks are liable to collect in large numbers between the claws and cause sores. This may be prevented by removing them and rubbing the skin with tar.
7. Wounds and sores are difficult to heal, and every effort should be made to prevent them, by careful attention to the fitting of the yoke, &c. The men should constantly look to this and make any small alterations which may be necessary at the mid-day halt.

8. TIME AND SPACE.

Rules for Determining Space and Time in Calculating the Formation of a Column.

1. It may be taken that all troops, mounted or dismounted, move to the starting point at the rate of 100 yards per minute, and that the following approximate space is occupied in column of route.

Cav. or M.I. in sects. or fours ...	1 yard per horse in the ranks.	
Cav. or M.I. in half secs. or files	2 yards per horse in the ranks.	
Inf. in fours	1 yard per 2 men in the ranks.	
Each 1- or 2-horse gun or vehicle	10 yards	including distances
" 4-horse " "	15 "	
" 6- " " "	30 "	
" 2-mule or pony "	7 "	
" pack animal (except camels) single file ...	4 "	
" camel, single file	5 "	
" bicycle	6 "	

Light Tractors	5 yards	exclusive of distances.
Lorries	6 ,,	
4-ton trucks	6 ,,	exclusive of distances, but inclusive of drawbars.
5-ton platform trucks ...	6 ,,	
Water tanks	5 ,,	
Travelling vans	5 ,,	
Light tractor with 4-ton truck and G.S. wagon ...	16 ,,	exclusive of distances between trains.

ii. Road Space Tables.

1. The following assumptions are made in calculating the spaces given below, which include internal distances.

Cavalry in column of sections.
Artillery ,, ,, route.
Infantry ,, ,, fours.
Vehicles in single file.
Bicycles in file ... ... } included in 1st line transport.
Spare horses and pack animals two abreast }
Headquarters of larger units allowed 3 yards per riding horse + transport.
Headquarters of smaller units in march formation.

2. The minimum distance between trains of a Mechanical Transport convoy is 10 yards, but when proceeding up and down steep hills distances should not be less than 40 yards.

NOTE.—Transport is on the normal winter scale as regards India.

	Home Establishment.*		Indian Establishment.			
			1st Line.		2nd Line.	
	Fighting Force, 1st Line Transport and Field Ambulance.	2nd Line Transport and A.S.C. Trains.	Fighting Troops.	1st Line Transport.	Without Tents.	With Tents.
	yards.	yards.	yards.	yards.	yards.	yards.
Headquarters—						
Cavalry Division ..	180	..	100	265	70	85
Division	165	...	60	210	75	95
Cavalry Brigade ...	90	...	50	120	35	42
Mounted Brigade ..	90	...	...	...	...	...
Infantry Brigade ...	75	...	25	75	45	55
Cavalry—						
Squadron or Irish Horse...	200	...	...	...	...	...
Rgtl. Hd. Qrs. and M.G. sect.	175	...	30	55	80	85
Regiment	805	...	550	575	300	365
Silladar—						
Headquarters... ..	...	...	30	55	65	70
Whole Regiment .	...	...	540	520	290	350
Non-Silladar—						
Headquarters... .	...	...	20	45	65	70
Whole Regiment ...	...	...	540	535	280	350

* The road spaces shown are based on the establishments after concentration, i.e., after baggage vehicles have been transferred to "Trains" and cooks' vehicles have been received from those units.

ROAD SPACE—*continued.*

	Home Establishment.*		Indian Establishment.			
			1st Line.		2nd Line.	
	Fighting Force. 1st Line Transport and Field Ambulance.	2nd Line Transport and A.S.C. Trains.	Fighting Troops.	1st Line Transport.	Without Tents.	With Tents.
Artillery—	yards.	yards.	yards.	yards.	yards.	yards.
Hd. Qrs. Cav. Divl. ...	40	...	...	...	...	...
H.A. Battery	515	..	470	140	105	140
.. Ammn. Column	775	...	...	...	...	...
.. Bde. less Ammn. Column ...	1,135	...	900	360	240	310
.. Battery with Mounted Bde.	545	...	...	...	...	...
.. Ammn. Coln. with Mtd. Bde.	395	..	...	...	...	...
Hd. Qrs. Divisional ...	55	.	.	...	..	..
F.A. Battery, 18-pr. ...	450	.	410	30	165	210
.. Ammn. Column, 18-pr	1,120	...	...	...	...	...
.. Brigade, 18-pr. less Ammn. Column ...	1,465	..	1,330	115	570	705
F.A. (5-in. Howitzer) Battery ...	380	...	350	30	165	195
.. (5-in. Howitzer) Ammn. Column	410	...	620	30	165	195
.. (5-in. Howitzer) Brigade less Ammn. Coln.	870	...	1,120	115	535	615
Heavy Battery, 60-pr.	340	..	...	...	...	...
" " " Ammn. Coln. ...	190	..	...	...	...	...
Divl. Ammn. Coln. ...	3,025	195	2,810	32	338	368
" " " F.A. Section	...	...	1,030	30	240	270
Divl. Ammn. Coln. F.A. Sub-section...	..	...	320	10	90	100
Divl. Ammn. Coln. S.A.A. Sect (1 Bde.)	..	...	415	...	20	20
Cavalry Bde. Ammn. Coln. ...	...	...	550	10	65	75
" " H.A. Sec.	...	...	315	10	45	50
30-pr. or 4-in. Heavy Battery	...	..	180	30	135	160
Ammunition Coln. ...	...	..	260	10	45	60
5-in. Heavy Battery...	..	...	560	30	150	180
Ammunition Coln. ...	...	..	450	10	45	60
British Mountain Bty.	...	...	610	...	285	340
Indian " "	.		610	...	270	335
Ammn. Coln. for 2 Mountain Batteries (British or Indian)	..	...	125	...	15	15
Hd. Qrs. Mountain Bde	..	..	10	20	10	15

* See note on page 31.

ROAD SPACE—*continued.*

	Home Establishment.*		Indian Establishment.			
			1st Line.		2nd Line.	
	Fighting Force, 1st Line Transport and Field Ambulance.	2nd Line Transport and A.S.C. Trains.	Fighting Troops.	1st Line Transport.	Without Tents.	With Tents.
Engineers—	yards.	yards.	yards.	yards.	yards.	yards.
Hd. Qrs. Div. or Cav. Divl.	40	...	10	28	7	14
Field Troop	180	...	...	...	...	...
Field Company ...	235	...	...	...	...	...
Wireless Telegraph Company	390	...	...	...	...	...
Divl. Tel Company ...	110	...	...	...	...	...
Signal Co. (Cable) ...	305	...	...	...	...	...
" " (Air-Line)	405	...	...	...	...	...
Balloon Company ...	180		...	...	...	...
Bridging Train ...	955	...	...	...	...	...
Service Company of Sappers and Miners	...	...	130	225	185	165
Field Troop of Sappers and Miners ...	...	...	50	80	65	70
Pontoon Section ...	...	...	1,040	40	120	135
Mounted Infantry—						
Company	200	..		...	...	...
Hd. Qrs. and M.G. section	165	...	...	...	...	...
Battalion	815	..	...		...	...
Infantry—						
Company	60	...	...	...	...	...
Hd. Qrs. and M.G. section	185	...	...	...	..	...
Battalion	695	..	420	420	570	720
Indian Inf. Bn. ...	...	...	380	370	465	585
Pioneer Battalion ...	...	...	380	490	480	615
Field Ambulances—						
Field Ambulance ...	400	.	.	...	600	630
Cavalry Field Ambulance	255	...	..	...	645	670
Indian Field Ambulance	..	...	..	...	560	590
Indian Cavalry Field Ambulance	...	...	.	...	630	645
Transport and Supply—						
Cavalry Train:—						
Hd. Qrs.	...	96	...	...	...	...
Hd. Qrs. Co. ...	...	570	...	...	...	...
Other Cos., each ...	..	1,944	...	..	...	...
Total Cavalry Train	...	2,540	. .	...	...	...

See note on page 31.

ROAD SPACE—*continued.*

	Home Establishment.*		Indian Establishment.			
			1st Line.		2nd Line.	
	Fighting Force, 1st Line Transport and Field Ambulance.	2nd Line Transport and A.S.C. Trains.	Fighting Troops.	1st Line Transport.	Without Tents.	With Tents.
Transport and Supply—cont.	yards.	yards.	yards.	yards.	yards.	yards.
Divisional Train:—						
Hd. Qrs	...	26	...	...	...	...
Hd. Qrs Co. ..	...	1,464	...	...	...	...
Other Cos., each ...	...	1,260	...	...	...	...
Total Divl. Train ...	...	3,720	...	...	...	...
Army Troops Train ...	...	474	...	...	...	...
Mounted Bde. Train	...	581	...	...	...	...
Cavalry Brigade ...	...	...	...	...	503	530
" Div. 2 Bdes....	...	...	...	...	2,130	2,160
" " 3 " ...	...	...	...	...	3,235	3,300
British Infantry Bde.	...	...	...	...	780	825
Mixed " "	...	...	...	...	850	895
Indian " "	...	...	...	...	700	730
Divisional Troops ...	...	...	...	...	1,060	1,200
Division	...	...	...	...	3,560	3,770
Higher Units—			miles.	miles.	miles.	miles.
Infantry Brigade ...	2,855 (1½ miles)	...	$\frac{3}{4}$	1	1½	1¾
Division	23,725 (13½ miles)	2,515 (1½ miles)	6½	4	10⅝	11¼
Mounted Brigade ...	3,710 (2 miles)	581	...	...	...	...
Cavalry Brigade ...	2,505 (1¼ miles)	...	1¼	1½	1½	1⅝
Cavalry Division ...	16,130 (9¼ miles)	3,540 (1½ miles)	...	...	...	...
Indian or Mixed Infantry Bde	...	...	$\frac{7}{8}$	1	1	1½
Mixed Infty. Bde. ...	...	...	$\frac{3}{4}$	1	1¼	2⅛
Divisional Troops ...	...	...	3¼	1	3¼	3¼

9. CAMPS AND BIVOUACS.

i. CAMP AND BIVOUAC SPACES.

1. In the table below, units are taken as being at war establishment. The spaces are calculated approximately on data given in F.S.R., Part I. When two numbers are given, *e.g.*, 160 × 150, the first signifies the frontage, the second the depth that is required.

2. Cavalry, mounted infantry and infantry require an alarm post of 60 yards depth, in front of the camp or bivouac, in addition to the depth shown below. Other arms fall in on the ground where they camp or bivouac.

3. In bivouac, the spaces given below for home establishment camps may be reduced if necessary, especially in the case of dismounted units.

* See note on page 31.

4. The spaces given below for India are for corps complete with personnel, but without vehicles.

Unit.	Home Est.	Indian Est.	
	Minimum camping space in yards.	Ordinary camping space in yards.	Contracted bivouac space in yards.
Army Headquarters	100 × 150	100 × 150	...
Divisional "	50 × 100	70 × 100	40 × 60
Brigade "	30 × 50	80 × 50	30 × 40
Cavalry.			
Cav. Regiment (British)	160 × 150	160 × 180	105 × 125
" Squadron "	55 × 150	80 × 90	70 × 70
" Regiment (Indian)	...	160 × 180	105 × 120
" Squadron "	...	80 × 90	70 × 60
Artillery.			
Battery, R.H. or R.F.A.	75 × 150	80 × 150	70 × 95
F.A. Brigade Ammunition Column ...	100 × 150	...	...
Heavy Artillery Battery	...	60 × 110	...
Mountain " "	...	80 × 100	...
Cavalry Brigade Ammunition Column	...	70 × 40	...
Divisional Ammunition Column ...	300 × 150	70 × 160	...
Field Artillery Section, Ammn. Coln.	...	155 × 70	...
Mountain " " " " ...	...	22 × 15	...
S.A.A. Section, Ammn. Coln.	...	25 × 70	...
Heavy Artillery Ammunition Column	...	70 × 70	...
Engineers.			
Field Troop	50 × 50	...	...
Wireless Telegraph Company	35 × 100	...	...
Divisional " "	35 × 50	...	...
Signal Company (Cable)	75 × 150	...	...
" " (Air Line)	75 × 150	...	...
Mounted Unit of S. and M.	...	80 × 100	...
Service Company of S. and M. ...	...	60 × 105	40 × 80
Pontoon Section	...	70 × 130	...
Balloon Company (Sec. in India) ...	50 × 50	60 × 100	...
Field Company	35 × 150	...	...
Infantry.			
Battalion M.I.	200 × 150	160 × 180	70 × 60
Infantry Battalion (British)	75 × 150	150 × 120	105 × 105
Infantry " (Indian)	...	150 × 100	105 × 90
Medical.			
Cavalry Field Ambulance	80 × 180	...	...
Field Ambulance (British)	120 × 200	64 × 64	60 × 50
" " (Indian)	...	64 × 64	50 × 50
Clearing Hospital	205 × 190	...	...
Stationary "	240 × 190	...	...
General "	550 × 400	...	...

CAMP SPACES—*continued.*

Unit	Home Est.	Indian Est.	
	Minimum camping space in yards	Ordinary camping space in yards.	Contracted bivouac space in yards.
Transport and Supply.			
Mule Corps for Cavalry Brigade ...	...	150 × 100	...
Pack Mule Corps	...	150 × 70	...
Pony Cart Train	...	150 × 130	...
Silladar Camel Corps	...	110 × 130	...
Bullock Train	...	150 × 130	...
Bde. or Div. Troops Supply Column...	...	100 × 100	...
Divisional Supply Column	...	150 × 200	...

NOTE.—The dimensions given above for supply column camps include space for camps of officers and establishment and for stacks of supplies.

5. The following spaces are required in *feet* for animals and vehicles.

Horse, mule, pony or bullock	8′ × 15′
Camel	9′ × 15′
Elephant	9′ × 21′
13-pr. or 18-pr. Q.F. gun and limber	7′ × 23′
Ammunition wagon and limber	7′ × 23′
Store cart, I.P.	7′ × 14′
Army transport cart	5½′ × 14′
G.S. wagon	6½′ × 22½′

6. In parking vehicles the following distances should be kept clear in front of guns or vehicles, which should be parked with the units to which they belong:—

Heavy gun, 8 horses	16 yards.
6-horse gun or vehicle	12 "
4-horse vehicle	8 "
1- or 2-horse vehicle	5 "

7. When British and Indian troops camp together—

Do not put slaughter places for British troops near Hindu troops. The slaughter places should also be screened from view.

Do not let British troops go near native cooking places or watering places, nor touch natives' cooking utensils.

8. Types of bivouacs are shown on Plates 1-4.

The ground available will often necessitate modifications, but the area occupied should be kept as small as possible.

These types are also suitable for camps when tents are available.

ii. CONSIDERATIONS AFFECTING CHOICE OF GROUND FOR CAMPS OR BIVOUACS.

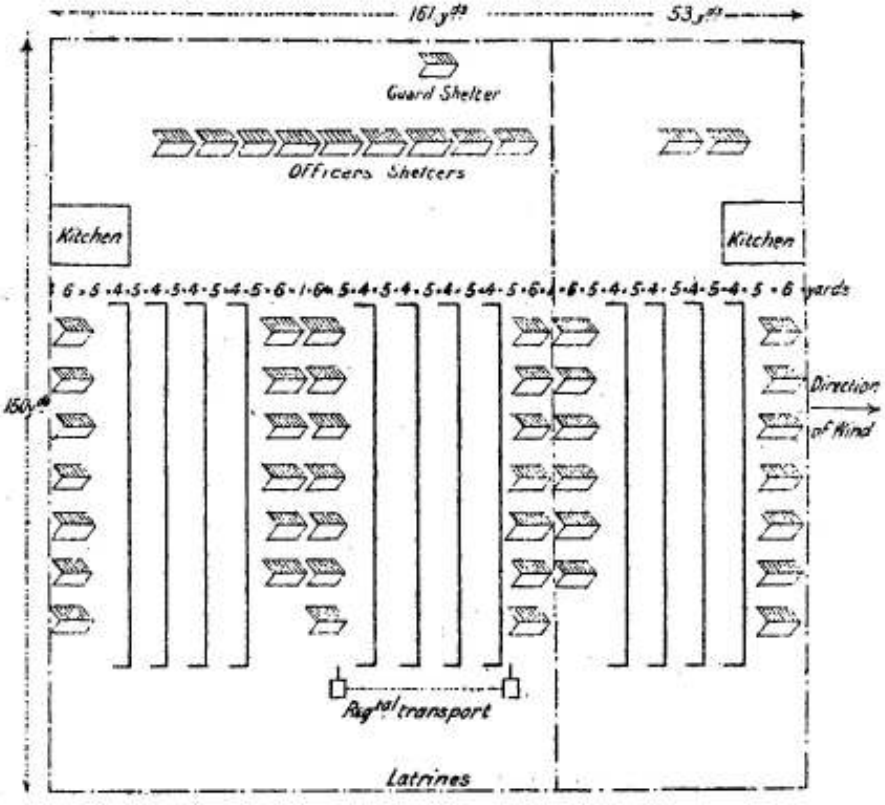
Tactical.

1. Favourable ground for defence in case of attack.
2. Concealment.

FIELD SERVICE.

Type of Bivouac.

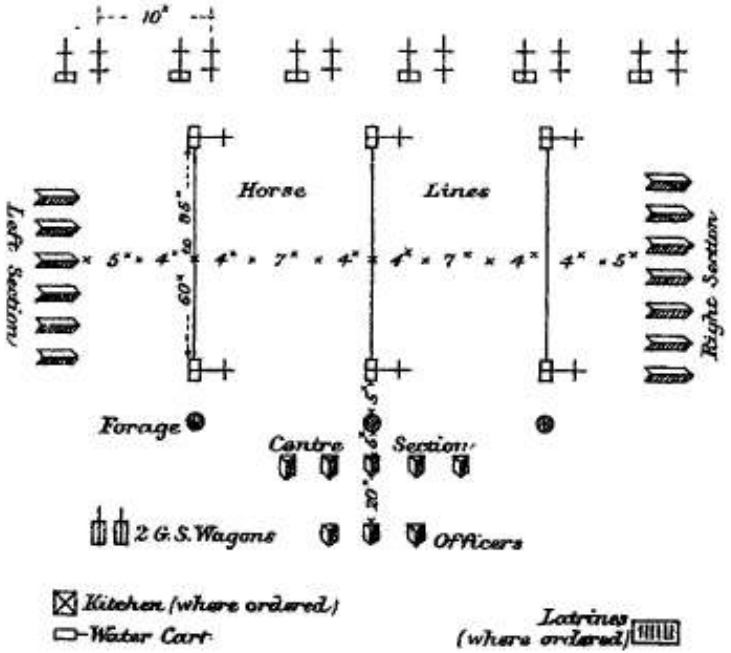
for a Cavalary Regiment or Battalion of M.I.



Weller & Graham, Ltd. Litho. London

To face page 36.

TYPE OF BIVOUAC FOR A BATTERY OF ARTILLERY AT WAR STRENGTH.



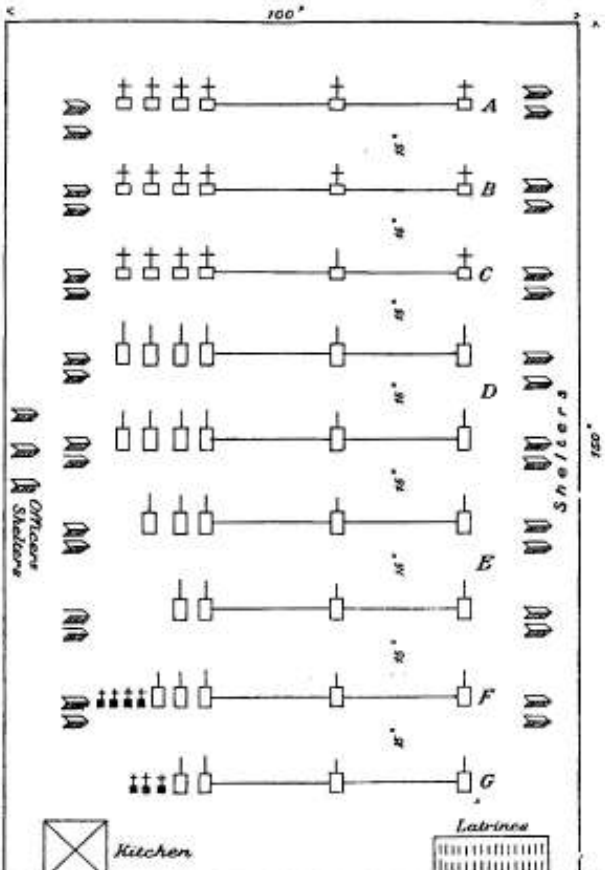
The horses of each section are fastened to one rope, using both sides of the rope. 5 feet between horses & end horses 5 yards from vehicle.

To follow Plate 1.

461. 23787/662. 85000. 12. 11

TYPE OF BIVOUAC FOR AMM. COLN. F.A. BDE.

(Suitable for Amm. Coln., Bridging Train, T. and S. Cols. field ambulances or other units with many vehicles.)



NOTE,— Ammunition Wag'ons —— ±

G. S. Wagons ——— □

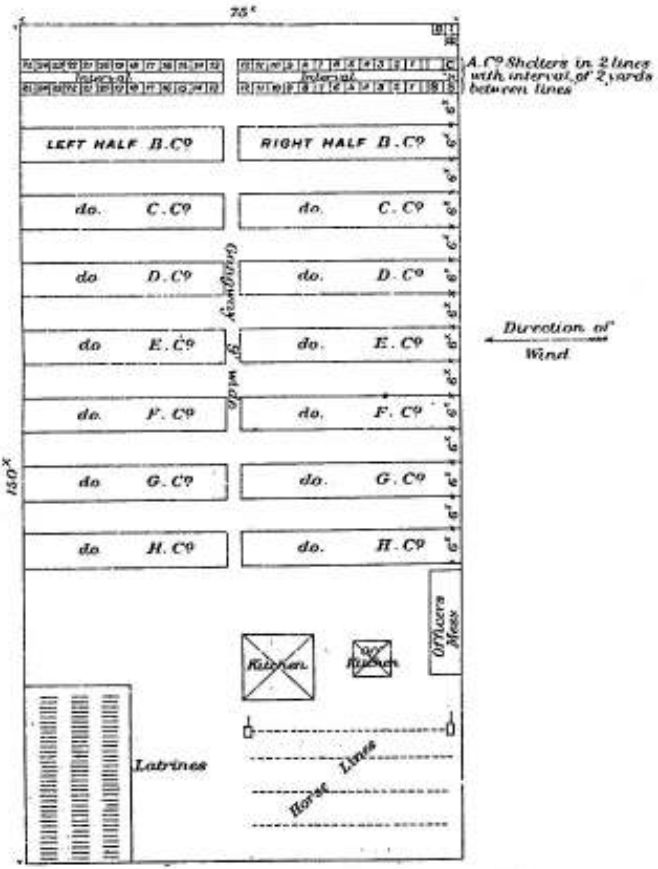
Limbered Wagons S.A.A. — ▲

Horses tied to ropes stretched between Nos 1, 2 and 3 wagons of sub-sections on both sides. Railway wagons at close interval.

To follow Plate 2.

Malby & Sons, Lith.

TYPE OF BIVOUAC FOR AN INFANTRY BATTALION.



Notes (1). Shelters marked I, II, and III, for C.O., Adjutant, and Senior Major
" " C for company commander*
" " S for subalterns
(2) Every shelter end on to the front; heads of sleepers towards front: rifles at sides
(3) The lateral space allowed is 8 ft for each shelter. If the company is over 100 strong or if a frontage of 75' is not available, the lateral space can be reduced to 6 feet

To follow Plate 3.

Malby & Sons, Lith.

3. Facilities of protection.
4. Economy of outposts.

iii. *General.*

1. Good water supply essential.
2. Comfort of troops and sanitary considerations.
3. Facilities for obtaining shelter, food, fuel, and straw.
4. Site should be dry, on grass if possible. Avoid steep slopes, gentle slopes facilitate drainage. Avoid large woods with undergrowth, low meadows, newly turned soil, and sites of old camping grounds. Clay is usually damp. Ravines and watercourses are dangerous.
5. If halted for a single night, troops should not be camped at a greater distance than 1 to 2 miles from the line of march next day.
6. Facility of approach and exit.

iv. Considerations affecting Allotment of Ground.

1. Each organized body of troops should be kept together under its own commander.
2. Areas allotted to subordinate commanders should be defined.
3. Areas should be allotted for water, fuel, and grazing.
4. Roads should be allotted to units.
5. Positions of latrines, kitchens and refuse-pits should be defined.
6. Responsibility for the destruction of bodies of dead animals must be definitely fixed and places for their disposal described.
7. Names of prominent features of surrounding country should be communicated to all officers.
8. Troops should never cross one another in going to defend ground.
9. Any special defensive, police, or sanitary measures to be taken by subordinate commanders should be communicated to them.
10. An officer sent on to select a camping ground, or sites for units in a camp, should make a rough sketch showing his proposed arrangements and the various approaches, to assist the officer who sends him out.
11. The following rules must be observed in distributing troops to areas, whether billets, camps or bivouacs are used:—

(*a*) If an engagement is anticipated, the larger units should be distributed in the order from front to rear in which they will come into action, provided that when liable to attack, infantry is in the more exposed positions; cavalry and other mounted troops in the less exposed. Artillery, columns, and medical units should always be covered by the other arms.
(*b*) Depôts should be near good roads.
(*c*) Dismounted units should be nearest the water supply.
(*d*) Staffs and hospitals have the first claim on buildings.
(*e*) When shelter is limited, cavalry and then other mounted troops have precedence of dismounted troops.
(*f*) Hospitals should be given a quiet spot and the most sanitary position.
(*g*) Staff and telegraph offices should adjoin, if possible, and should be clearly marked (*see* Plate 18.)
(*h*) Officers must be close to their men.

12. In telling off troops to billets, the following additional points should be observed:—

(a) Regard will be had both to the comfort of the men and the interests of the inhabitants.
(b) Staff offices should be on main communications, and easily found.
(c) Mounted men must be near their horses, guns, and wagons; and staff officers near their offices.
(d) Both sides of a street should be allotted to the same unit, to prevent confusion in case of alarm.
(e) Roads and communications must never be blocked.

v. Horses in Camp or Bivouac.

1. Choose sheltered spots for horse-lines, but avoid hollows where water may collect, and choose level ground. If no level ground available, the horse's head should be turned down hill. Shift after a wet night.

2. In very cold weather do not groom, but wisp and rub mud off legs. Put more covering on back.

3. Do not let a horse stand with his back wet exposed to a hot sun.

4. *Picketing Horses.*—Use airline when possible; 3 to 5 yards between picket line and heel pegs; 5 yards if possible between horses' heads; 5 feet between head ropes. Peg kickers separately.

Head rope should be only long enough to permit the horse to carry his head naturally when standing, too long rope permits him to get his leg over the rope and leads to heel galls.

In the case of a horse given to reining back, pass his head-rope through a shackle on the forefoot. This soon tires him of reining back.

5. Horses require hay, grass or some substitute in addition to grain. Give a hungry horse some hay first, then his oats.

6. Scrub nose-bags frequently, always turn and dry them in sun. They should not be interchangeable to avoid risk of spreading infection.

7. Avoid waste by keeping nose-bags in repair and by using hay nets when available.

Do not herd horses in mobs when grazing, have guards who should only mount when rounding up. Keep kickers well apart, or hobble their hind pasterns.

vi. Methods of Securing Horses.

1. *Tying up a horse.*—The following is a useful method for securing a horse to a bush or small tree.

Take a suitable branch or bunch of branches, place the loop of the reins under and round it, then double back the end of the branch, breaking, if necessary, and pass it through the reins as shewn in Fig. 1 and tighten up. A separate piece of stick will answer for the same purpose.

The more the horse pulls the tighter will the knot become, whereas the man can unfasten it very rapidly by simply pulling back the doubled end of the branch or piece of stick through the loop in the reins.

Fig. 1.

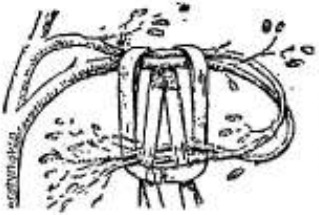
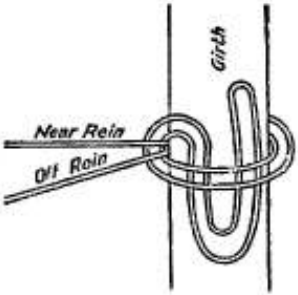


Fig. 2.



2. Single horses can also be kept from straying as follows:—

(a) By knee-haltering.—The correct knot for knee-haltering is a clove hitch, fairly tight, above the knee, with a keeper knot (half-hitch) round the rope to prevent it from coming loose. The end should then be carried back to the head collar and so secured that the horse cannot tread on it. The rope should be from 1 foot to 1 foot 6 inches from knee to lower ring of jowl piece of head-collar.

(b) By securing the bit to the stirrup iron by means of the rein or strap.

(c) By securing the bridoon rein to the girth on the rear side, as shown in Fig. 2. It should be drawn sufficiently tight to bend the horse's head to the left. When mounting in haste the rider can easily loosen the slip knot after mounting, and then pull the reins clear and pass them over the horse's head.

3. *Coupling horses.*—Horses can be securely coupled by turning them head to tail and tying each with the bridoon rein to the off back-strap or arch of the saddle of the other, taking care that the reins, when tied, are not more than 6 to 8 inches long. (*See* Fig. 3.)

Fig. 3.

4. *Linking horses.*—The head ropes are brought over the horses' heads clear of the reins, without unfastening the coil or knot. Each man hands his rope to the man on his right, who passes it through the upper ring of his own horse's head collar, and ties it with two half-hitches.

With three horses one can be tied to the head collar of either of the two horses so coupled. Four horses are secured by tying a horse to each of the two originally coupled. No horse should have more than 1 foot length of rein, and the best knot to be used is a slip knot round the rein itself.

vii. Care of Saddlery.

1. Keep leather work soft and supple. Girths should be greased regularly. Keep steel work oiled.
2. Do not wash leather in hot water or allow it to soak in any water.
3. Keep inside of nose-bags clean.
4. Wrap saddlery in water-proof sheets and keep it off ground when possible.

viii. Harnessing.

1. See that saddle blanket is clean and evenly folded, and that it does not rest on the horse's withers.
2. Girth sufficiently tight to keep saddle in place. Tighten girth gradually.
3. Bridoon or Portmouth bit should, as a general rule, touch corners of mouth without wrinkling them.
4. Curb laid in chin groove and adjusted so that when bit is pulled back the angle formed by bit and mouth is from 30 to 45 degrees depending on the horse.

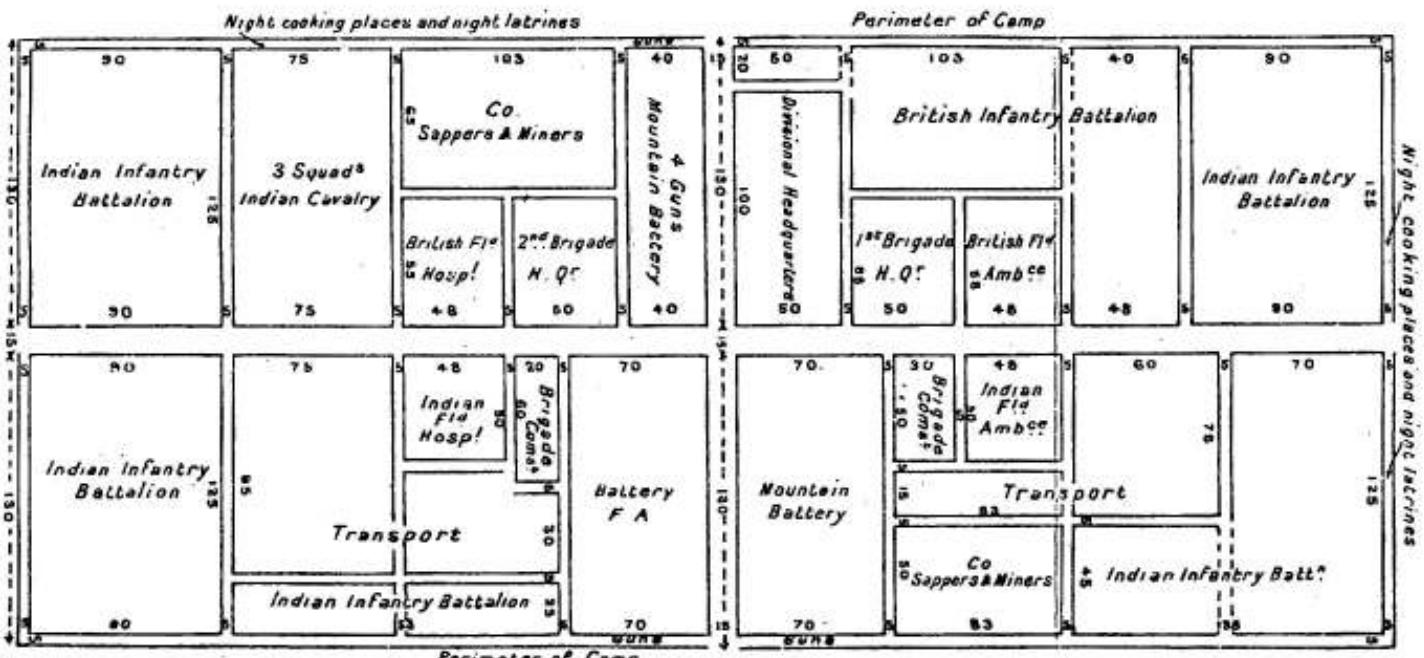
ix. Camps in Mountain Warfare.

1. When selecting the site, the necessity for occupying the chief points from which snipers can fire into the camp and for forming a defensible perimeter round it should be borne in mind.
2. To adapt the site to the force lay out the longest diameter, then the cross diameter and allot space to units along these cross roads (which should be 15 yards wide, if possible). *See* Plate 5 for type of perimeter camp.
3. The following points should be attended to:—
   (a) All troops fall in on their alarm posts as soon as possible after camp is laid out, and every evening at sundown.
   (b) Prepare perimeter 5 yards clear of all shelters with breast work and entanglement.
   (c) No cooking places or latrines inside camp.
   (d) Camels should be in a zareba outside.

Tents.

	Pitching space.	Approx. weight in lbs. (complete)	Accommodation.
Circular Tent, single ...	radius 9' 9"	84	15 men
" " double ...	" 10'	119	" "
Shelter "	12' × 7'	14½	2 "
Hospital Marquee, large ...	80' × 55'	1,149	
" " small...	50' × 35'	512	
Operating tent	48' × 40'	181	
Store "	76' × 60'	670	
Telegraph "	82' × 29'	120	
E.P. " (peace only)	40' × 86'	900	16 British.
S. Sjts. "	29' × 28'	500	2 S. Serjeants.
Store	150' × 40'		Cover afforded 130' × 15'.
G.S. Tent, India (160lb.) ...	22' × 16'	160	16 British or 20 Native Soldiers.
" " " (80lb.) ...	16' × 10'	85	8 British or 10 Native Soldiers.
" " " (40lb.) ...	12' × 10'	41	1 Warrant or N.C.O.
" " " (31lb.) ...	9½' × 7'	31	
" " " (Officers')	14' × 9'	80	2 Officers.

TYPE OF PERIMETER CAMP.
FOR A MIXED FORCE.



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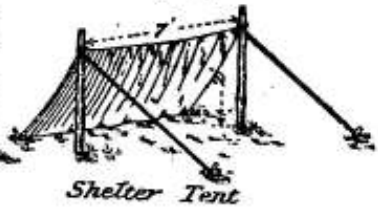
BIVOUACS

Fig. 1.

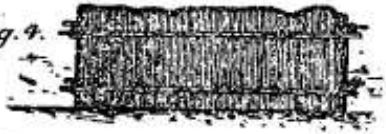
Fig. 2.



Shelter Tent

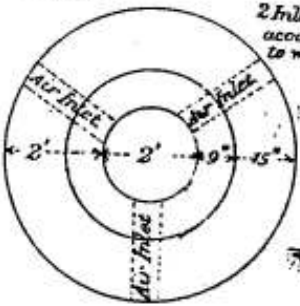
Fig. 3.

Fig. 4.

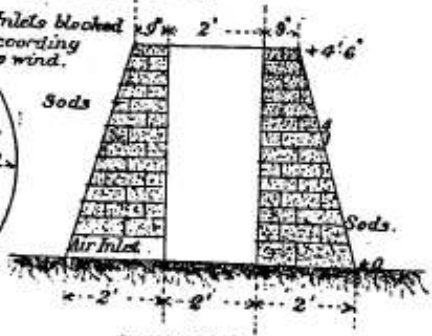


REFUSE DESTRUCTOR.

Fig. 5.



PLAN.



SECTION.

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FIG. 1. COOKING IN THE FIELD

FIG. 2. OVEN BURROWED NEAR TOP OF A BANK

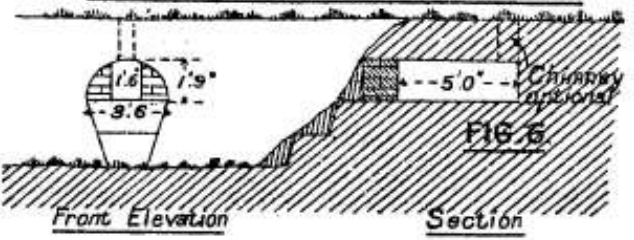

FIG. 3. SECTION OF COOKING TRENCH

FIG. 5

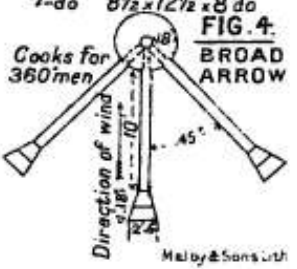

FIG. 4. BROAD ARROW

To follow Plate 6.

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With Circular Tents accommodation is allowed as follows:—

Generals, Colonels and C.O.'s	1 to 1 tent	
Other Officers	3 „ 1 „	
Men	15 „ 1 „	
W. Officers	5 „ 1 „	or 1 W.O. takes the place of 3 men.
Serjeants	7 „ 1 „	or 1 Sjt. „ „ „ 2 men.

xi. Intervals in Camp.

1 yard	between pegs of each tent.	
1 „	„	Squadrons.
3 yards	„	Companies.
10 „	„	Units.

xii Pitching Tents (Circular).

Points to be attended to.

1. Mark centre with peg. Describe a circle, with radius of 4 paces, on which the pegs will be. In this circle, drive in the two pegs opposite the door of the tent one pace apart. At 3 paces from these pegs, on either side of them, drive in pegs for guy ropes. The other guy rope pegs will be 5 paces from these and 5 paces from each other.
2. Put up tent, pole to be set and kept perfectly upright.
3. Drive in the other pegs, which should be one pace apart and in line with the seams of the tent.
4. Doors, if possible, point to leeward.
5. 7½ yards from centre to centre of tents.
6. Cut drains round bottom of tent walls, and heap earth inside flap.
7. Dig a hole 6 inches deep close to tent pole, then if heavy rain comes on suddenly, the tent pole can be pushed into the hole and much strain is taken off the canvas, ropes and pegs.

For Types of Bivouac Shelters see Plate 6.

Plate 6 suggests methods of forming simple shelters.

Fig. 1, two forked sticks driven into the ground with a pole resting on them; branches are then laid resting on the pole, thick end uppermost, at an angle of about 45°, and the screen made good with smaller branches, ferns, &c.

A hurdle may be supported and treated in a similar way.

Fig. 2, a waterproof sheet, blanket, or piece of canvas secured by poles and string.

Fig. 3, a *tent d'abri* for four men, formed with two blankets or waterproof sheets laced together at the ridge, the remaining two blankets being available for cover inside.

Fig. 4, a wall of straw or reeds nipped between two pairs of sticks, tied together at intervals.

When no other materials than earth and brushwood are available, a comfortable bivouac for 12 men can be formed by excavating a circle with a diameter of 18 feet, or thereabouts, and piling up the earth to form a wall 2 feet or 3 feet high. The men lie down, like the spokes of a wheel, with their feet towards the centre. Branches of trees, or brushwood stuck into the wall, improve the shelter.

Huts can be made by thatching with stalks of any grain. In the absence of ropes, creepers can be used, if available.

10. CAMP COOKING, &c.

1. A method of cooking in the field is shown in Plate 7. Camp kettles (large) will cook for 8 men with vegetables, or for 15 without, small will cook for 5 men with vegetables, or for 8 without.

2. *Camp Cooking.*—Bones should never be thrown away, but broken up and stewed for about 10 hours in all; meat, bones, or vegetables for soup should always be put into cold water and boiled in it, and not put into boiling water.

3. Indian corn, yams, and plantains can be left over the camp fire at night. The first requires a good deal of cooking, and a little animal fat or edible oil should be mixed with it. Dried beans and peas require soaking, and should be boiled slowly in plenty of water.

4. Meat, previously wrapped up in paper or cloth, may with economy be baked in a clay case, in any sort of pit or oven, well covered over, or may be baked as follows: Dig in the ground a hole of sufficient size and build a fire in it. After the fuel has become red-hot, put in the meat with the skin on, on a thick layer of green grass; cover it with green grass, hot ashes and earth. Build a good fire over the meat and keep it burning for about six hours. Unearth the meat and remove the skin. Meat treated in this way at night will be found cooked in the morning.

5. When fuel is scarce, a good plan is to cook the meat partly in a kettle, and when the contents are at boiling temperature, place the kettle in a box, surround it with hay or other non-conducting material, and close the lid tightly, the contents will go on gently stewing, and should be fully cooked in three or four hours' time.

6. *Boiling* entails a loss of about 30 per cent. in weight. Water should not be hotter than 160°. Put the meat into boiling water, let it boil for five minutes, then reduce the temperature, either by pouring in cold water, or by reducing the fire. Allow a quarter of an hour for every pound of meat.

7. In *Roasting*, allow a quarter of an hour for each pound. Expose the meat at first to great heat.

8. *Vegetables.*—Potatoes take from 20 to 30 minutes boiling.

Carrots and parsnips 20 to 45 minutes.

Rice, after being washed and soaked, 20 to 25 minutes.

Dried vegetables should be soaked for about four hours, and then boiled slowly.

II. Receipts

Kabobs, &c.—For a hurried dinner, broil the rib-bones, or skewer a dozen small lumps of meat and roast them.

Chops and steaks may be cooked in a frying pan, or broiled on a gridiron made of bent wire or a piece of perforated tin; when the meat is tough cut it into thin slices, and hammer to break up the fibre.

Salt meat, pork, or ham, when required hurriedly, should be cut into thin slices, placed in cold water, and brought to boiling point to extract the salt; this may be repeated until the meat is found palatable. Salt meat treated in this way may, if time will allow, be used for stews in the same way as fresh meat.

Stewed Beef, Mutton, Venison, or Fowl.—Cut up the meat into thin slices or small pieces, the smaller the better, put a little fat into the bottom of the cooking pot, and when hot put in the meat, stir till brown, add a sliced onion, carrot, or turnip, season with pepper and salt, add a little flour and some hot water, stir well, and allow to simmer slowly till done.

On no account should stews be allowed to boil rapidly; if this is not prevented, the meat instead of being tender will be hard and tough. No matter how rapidly water boils, the temperature never exceeds 220° Fahrenheit, and meat will cook at 170° to 180°. Frying the meat for stews can be dispensed with if time does not admit. Tomatoes, rice, and powdered biscuits (in lieu of flour) may be added to stews.

Stew made of Preserved Meat and Vegetables.—Cut up the meat, removing all fat and jelly, powder up the vegetables, and put them in a kettle or mess tin with water, cook until done, strain

off most of the water, add meat and jelly, and season with pepper, salt, and a teaspoonful of brown sugar. Put on the lid, and allow to heat through, then serve. The secret of making palatable dishes with preserved meat is only to heat it through, as cooking spoils it.

If fresh vegetables are obtainable, they should be fried first, then stewed, and added to the meat.

Mutton or Beef Soup.—For 6 persons, 1½ lbs. of meat, 1 onion, 2 carrots, 1 turnip, 6 tablespoonfuls of rice or barley. Cut the meat up into small pieces, peel and slice the onion, clean and cut up the other vegetables, put a little fat into the camp kettle, fry the meat and vegetables a light brown colour, add 5 pints of water and the rice or barley; stew slowly for about 1½ hours, and take off the scum as it rises, season with pepper and salt, and serve. When time does not admit, the frying of the meat and vegetables may be dispensed with. Semolina, tapioca, sago, macaroni, tomatoes, green peas, beans, lentils, &c., can be substituted for the rice or barley.

Chicken Broth.—Pluck and clean chicken, remove the meat from the breast, break up the remainder, and put into a kettle, add 3 pints of cold water, bring to a boil, remove the scum, and continue boiling slowly for 1½ hours, season with salt; strain, and serve. Two tablespoonfuls of rice may be added about half an hour before serving.

Beef Tea.—Cut up about one pound of lean beef (no fat) into small pieces, put in a kettle, add 2 pints of cold water, boil slowly, removing the scum as it rises, cook for about 2 hours, or longer if time admits; strain and serve.

Preserved Meat Soup.—Take 4 ounces of meat and half a biscuit per man with his allowance of preserved vegetables, cut up the meat, and powder the biscuit and vegetables. Put the vegetables into a camp kettle containing half a pint of cold water per man, boil slowly, and add the meat and biscuit, and continue the boiling for half an hour, season with pepper and salt, if required, and serve; a quarter of a teaspoonful of brown sugar for each man may be added to improve the flavour.

Erbswurst Soup.—Crush the Erbswurst to a powder, adding cold water gradually, stirring well to break up lumps, bring slowly to a boil, stir well, cook for about 30 minutes, and serve.

Plain Rice Pudding.—Boil 1 pound of rice in 6 quarts of water for 30 minutes, season with a pinch of salt, strain and save the water; put the rice into a dish, add 6 ounces of sugar, half a tin of condensed milk, a little of the water which has been strained off, stir well, and grate a little nutmeg or rind of a lemon on the top, place the dish on some embers, cover with a piece of tin, on this put some more embers, and bake for 20 minutes. If fresh milk is used, add two more ounces of sugar. If milk is not obtainable, the rice water alone may be used. If an egg is added, it should be beaten up with the milk or rice water; this is a great improvement.

Barley Water.—Put into a saucepan 7 pints of water, 2 oz. of barley, which stir now and then when boiling; add 2 oz. white sugar and the rind of a lemon thinly peeled. Let it boil gently for about an hour without covering it, pass it through a sieve or colander; it is then ready. The barley and lemon may remain in it, or add to it a little brown sugar or treacle.

Lemonade.—Put into a basin 2 tablespoonfuls of brown sugar, 1½ tablespoonfuls of limejuice; mix well together for half a minute, add 1 pint of boiled or filtered water, and the beverage is ready.

Milk.—Milk (other than sterilized or condensed) should be boiled before use.

11. SANITATION OF CAMPS AND BIVOUACS.

1. The importance of prevention of disease on field service cannot be over-estimated. Neglect of sanitary measures inevitably results in great loss of life, and disease may assume such proportions as to paralyse the efficiency of a force. It is the duty of both officers and men to comply strictly with orders relating to the preservation of health. To keep himself healthy and fit is a duty that every soldier owes to his country, his comrades, and himself.

2. In all camps the utmost care must be taken to prevent fouling of ground by excreta and refuse. Therefore urinals and latrines should be made immediately on arrival at a camp or bivouac, and should be filled in at the last possible moment.

3. Great attention must be paid to camp kitchens. Kitchen slop water should be disposed of in pits covered with brushwood, straw or any other material that will retain the grease. The brushwood, etc., should then be used as fuel in the kitchen fires. The habit of throwing kitchen water about to allay dust increases instead of diminishing discomfort in camp.

4. Dust and flies must be kept off food. Horse dung and stable litter should be burnt if possible. The former is the natural breeding place of flies, and to keep camps free from flies they must also be kept free from accumulations of horse dung and stable litter.

5. For refuse the rule is:—Burn all you can and bury what you cannot burn. This should be done daily. See below for burning. If dead animals cannot be burnt or buried, they should be dragged away from any ground likely to be used for camping, and their bellies opened to let gases escape.

6. To keep tents dry they should be trenched; roll up flies of tents every morning; air blankets and kits whenever possible.

7. Cleanliness of person and clothing, particularly underclothing, is of the greatest importance.

8. Latrines, urinals, refuse pits, horse and cattle lines, and slaughtering places, must be placed as far as possible from the kitchens, from any source of water supply, and to leeward if possible. They must never be placed in any gullies which, when it rains, may discharge into the water supply. A sanitary policeman should be placed in charge of each latrine, his duty being to see that every man covers up his excreta with earth. Failure to carry out this practice should be punished.

Slaughtering places should not be near horse lines.

9. In camps short trench latrines should be dug. Each trench should be 3ft. long, 1ft. wide, and 1ft. deep, the interspace between each trench being 2½ft.; men should use these trenches straddlewise, and at once cover up their deposit with earth. Five trenches will suffice for 100 men for one day; they should then be filled in with earth and the turf replaced.

Trenches required for the second day of occupation will be dug in the spaces between the first row of trenches.

The method of preparing the short trench latrine is shown in Plate 8, Fig. 1.

If the area of ground be limited, the depth of the short trench may be increased to 2ft.; these deeper trenches should last 2 days.

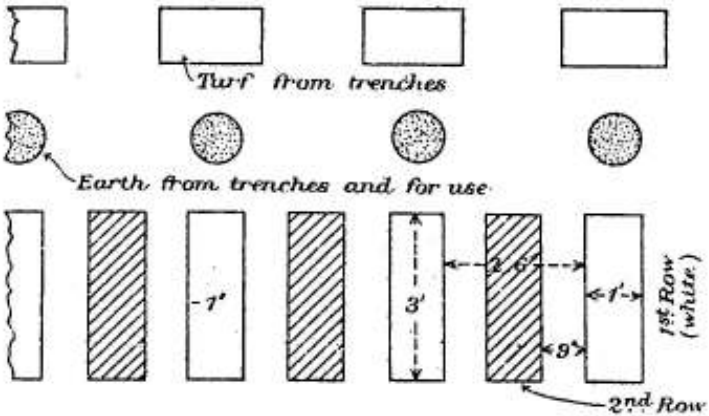
In exceptional cases deep latrines may be necessary, they should be constructed to seat 5 per cent. of the troops, one yard per man being allowed. This type of latrine is shown in Plate 8.

The position of all old latrines should be marked with the letter L made with stones, etc.

LATRINES

Fig. 1.

PLAN.



When filled in, the next series of trenches may be made in the 2' 6" interspace if ground is limited. The turf must be removed carefully and the excavated earth put behind each trench – this earth must be well broken up.

Fig. 2

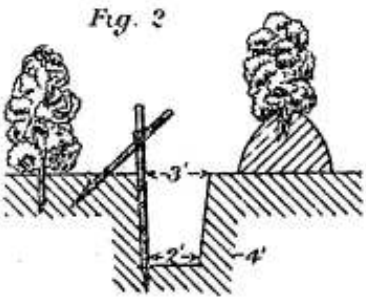
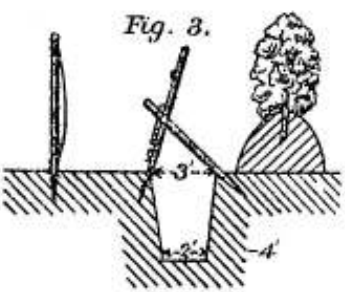


Fig. 3.



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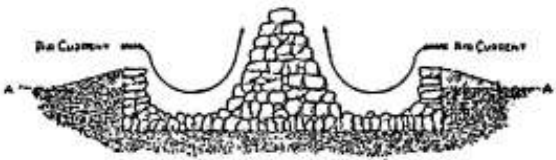
10. The following is a useful method of disposing of refuse by burning:—

Dig a circular pit, 3 feet deep and 15 feet in diameter. Cover the bottom with loose stones to a depth of 14 inches. Build a wall round the pit to the height of one foot above the original ground level, and pack the excavated earth against it so as to form a sloping approach and to prevent surface water gaining access to the pit. Build a pyramid of large stones 4 to 5 feet high in the centre, to provide central draught and steady fire. Start a wood fire and as soon as the stones become hot, throw in refuse, garbage, &c. The liquid portions disappear and the solid portions are dried and are soon reduced to ashes. (*See also* Plate 6.)



Crematory—Vertical Section. A. A.—Ground Level.

11. *Disinfectants.*—For general use, cresol solution and chloride of lime are the most efficacious. To use cresol, mix 1½ ounces of cresol solution with 1 gallon of water.

Clothing may be disinfected by being plunged into boiling water, or by being baked in an oven heated from 210° to 250°.

12. WATER SUPPLY.

1. A daily average of 1 gallon per man is sufficient for drinking and cooking purposes. A horse, bullock, or mule drinks about 1½ gallons at a time. In standing camps, an average allowance of 5 gallons should be given for a man, and 10 gallons for a horse or a camel. An elephant drinks 25 gallons, each mule or ox drinks 6 to 8 gallons, each sheep or pig 6 to 8 pints. These are minimum quantities. *See also* F.S.R., Part I.

One cubic foot of water = 6¼ gallons (a gallon = 10 lbs.).

2. The rough average yield of a stream may be measured as follows:—Select some 12 or 15 yards of the stream where the channel is fairly uniform and there are no eddies. Take the breadth and average depth in feet in three or four places. Drop in a chip of wood and find the time it takes to travel, say 30 feet. Thus obtain the surface velocity in feet per second. Four-fifths of this will give the mean velocity, and this multiplied by the sectional area will give the yield per second in cubic feet of water.

ii. *Purity of Water.*

1. As the health of a force depends largely on the purity of the water provided, everything possible must be done to ensure an ample supply of pure drinking water, and to keep it pure when obtained. It is mainly through drinking impure or contaminated water that cholera, dysentery, and enteric fever are contracted and spread. The water supply will always be selected in conjunction with the sanitary or other medical officer, who will satisfy himself as to its fitness for use. No water should be used for drinking purposes that has not been sterilized by filtration, by boiling, or by chemical means.

2. The filter usually provided is the filter water tank; this will sterilize about 200 gallons in an hour. Another, the portable filter, capable of being carried on a pack saddle, will filter 60 gallons an hour. If water is very muddy, some attempt should be made to clarify it before attempting to pass it through either of these filters. To do otherwise would probably cause clogging of the candles. The filter candles should be boiled in water every fourth day.

3. Purification of water by heat can be secured by either (1) boiling in an open vessel, in which case the water should be kept on the boil for at least five minutes; or (2) heating in a special sterilizer, such as the "Griffith." The small type of these machines will sterilize 60 gallons an hour, the larger type 350 gallons in an hour. Both use kerosene oil; the average consumption of fuel being one gallon of oil for each 400 gallons of water. The sterilized water issues cool and quite fit to drink.

4. Men must be prevented from drinking water from unauthorized sources, and they must be trained to economise the contents of their water bottles, which, before marching, should be filled with weak tea or sterilized water. Bad water drunk on an empty stomach is more dangerous than that drunk with a meal. Thirst is best assuaged by first moistening the lips and mouth, and only drinking a small quantity at a time. Large draughts of water should never be taken, as thirst is only increased thereby, and, if taken when the body is overheated, bad effects may follow.

5. Vessels or tanks in which drinking water is stored, as well as being carefully covered, should be raised off the ground and they should be provided with taps.

To Wash Out Water Receptacles.—Use mixture of 16 grains permanganate of potash to 1 gallon of water, or, roughly, 1 teaspoonful to 3 gallons. If, after rinsing, mixture comes out discoloured, it shows cleansing was necessary; repeat process till mixture comes out with pink colour not destroyed.

6. Posts on the lines of communication should arrange to have enough sterilized water on hand to supply the wants of detachments passing through.

A simple method of sterlizing any water which it might be dangerous to drink, is as follows:—

(a) Take a teaspoonful of bleaching powder (chloride of lime) (containing about ½ available chlorine) and remove the excess of powder by rolling a pencil, etc., along the top of the spoon.

(b) Dissolve the bleaching powder in a cupful of water, making sure that all lumps are thoroughly broken up, and then add three more cupfuls of water to the solution.

(c) Stir up the mixture, allow it to stand for a few seconds to let any particles settle (this stock solution, if kept tightly stoppered, may be used for 4 or 5 days) and add *one teaspoonful* of this milky solution to 2 gallons of the water to be purified. Stir thoroughly and allow to stand for 10 minutes. This will give ½ part of free chlorine to a million parts of water. 1lb. chloride is sufficient for 66,000 gallons.

Note.—Bleaching powder (chloride of lime) deteriorates rapidly when kept in cardboard packages or exposed to air. If a weak variety only is obtainable then 1½ teaspoonfuls of the solution should be added to 2 gallons of water.

7. Muddy water must be cleared of suspended matter before being either boiled or filtered. The following methods may be used:—

(a) Alum (6 grains to the gallon) stirred into the water and allowed to stand hastens the deposit of the suspended matter.

(b) Tack a sheet on to a wooden frame so as to form a bag or basin; put a couple of handfuls of wood ashes in the bottom and then pour on the water, placing a receptacle beneath to catch the water which percolates through.

(c) Take two casks and place one inside the other, the outer cask pierced with holes at the bottom and the inner near the top; the space between is filled with sand, or gravel; when these are placed in a stream, the water rises through the filtering material between the barrels and flows into the inner one.

iii. *Watering Arrangements.*

1. As a rule the military police, otherwise the first troops to arrive at a halting ground, will mount sentries on all water likely to be required for use, with such orders as will prevent any form of pollution. These sentries will not be withdrawn until permanent water guards are detailed.

2. Watering places may be detailed for the common use of all units, or separate arrangements made for each administrative district.

3. If water is obtained from a stream, horses will be watered below the place where troops obtain their drinking water, but above bathing and washing places. Patrolling by mounted men will often be necessary for some distance above the spot where the drinking water is drawn.

4. The water supply will usually be marked with flags, as follows, by the advanced party of engineers:—

White for drinking water;
Blue for watering places for animals;
Red for washing or bathing places.

5. Never allow washing where water may filter through to drinking water. Never allow drinking from water from impure or doubtful sources.

6. If running water is not available, the supply must be very strictly protected, a rough barbed wire fence, if procurable, being run round it to keep animals out. Animals should, in this case, be watered by bucket or nosebag; and washing should be allowed only at some distance from the water supply, empty biscuit tins, or other receptacles, being used to draw water for this purpose.

Similar precautions are often necessary with running water, if other bodies of troops are halted lower down the stream.

7. If many animals have to be watered and the frontage is small, hours should be laid down for each corps to water. Five minutes may be taken as the average time for watering an animal.

An officer will invariably accompany watering parties of more than twenty animals.

8. A Field Troop carries 2 and a Field Company 4 lift and force pumps, with suction and delivery hose, and a similar number of troughs. A lift and force pump can supply 600 gallons an hour at a combined lift and force of 60', with 4 men at work, but twice that amount with 2 or 3 men if the height to which the water is to be raised is small. A trough measures 33' x 2' 6", and contains 600 gallons. Allowing 4' per horse, 5 minutes for each horse to drink, and watering from only one side of the trough, 96 horses can be watered from one trough in an hour.

CHAPTER III.

13. ORDERS.

i. General Rules regarding the Preparation and Despatch of Orders, Reports and Messages.

1. Orders, reports, and messages may be verbal or written, according to circumstances. The following general rules should be observed:—

(a) Orders issued by the higher commanders, reports and messages will normally be prepared in writing. When issued verbally or sent by signal, they will be confirmed in writing on the first opportunity. In war verbal messages are often incorrectly delivered, especially in the excitement of an engagement.

(b) Orders, reports and messages must be as concise as possible, consistent with clearness. They must be precise as regards time and place, the language should be simple and the handwriting easily legible. Anything of an indefinite or conditional nature such as "dawn," "if possible," "should," is to be avoided.

(c) The hour of 12 will be followed by "noon" or "midnight" written in words.
A night will be described thus:—Night 29/30 Sept.; or Night 30 Sept./1 Oct.

(d) Names of places and persons will be written in block capitals, *e.g.*, LONDON or WELLINGTON, and must be spelt exactly as given on the map in use. Units are to be described only by abbreviations about which there can be no doubt. When brigades are mentioned, the arm to which they belong should be indicated, *e.g.*, 2nd Inf. Bde., 3rd Cav. Bde., 4th Bde. R.F.A.

(e) In naming units from which a portion is excluded, the unit will be named and the words "less....." appended, *e.g.*, 10th Hrs. less one sqn.

(f) If a map is referred to, the one used must be specified. The position of places will, as a rule, be denoted either by the points of the compass, *e.g.*, "wood, 600 yards S.E. of TETSWORTH," or, when no points of reference are available by actual compass bearings, *e.g.*, "hill, 1,500 yards true bearing 272° from CHOBHAM CHURCH," or by descriptions, *e.g.*, "cross roads ½ mile S.W. of the second E in HASELEY," the letter indicated being underlined. A road is best indicated by the names of places on it, care being taken to name sufficient places to ensure that the road intended is followed. A position, whether occupied by hostile troops or not, will be described from right to left, looking in the direction of the enemy. The terms "right" and "left" are used in describing river banks, it being assumed that the writer is looking down stream. Except in the foregoing case, indefinite or ambiguous terms, such as right, before, beyond, front, on this side of, &c., must not be used, unless it is made clear to what force they refer.

(g) When bearings are given they will invariably be true bearings, and this should be so stated. The variations of compasses must be checked before use.

(h) If the order, report, or message refers to troops reaching a place at a certain time, it is assumed that the head of the main body is meant, unless otherwise stated.

(j) The writer, having finished his order, report, or message should read it through carefully at least once, and, if possible, get someone else to read it, in order to assure himself that it is clear, and, in the case of an order, that it is calculated to influence the recipient in the way only that it is intended.

(k) An order, report or message must be clearly signed, the rank of the sender, his appointment, and the force he is with, being stated.

(l) A copy of all orders and messages sent will be kept by the sender, the copy and original being endorsed with the method and hour of issue or transmission, *e.g.*, "personally to general staff officers of 1st and 2nd divisions at 11.20 a.m.," or "Wired to G.O.'s C. 2nd and 3rd cavalry brigades at 2.30 p.m."

(m) The field message book (A.B. 153) and envelope (A.F. C 398) should be used when obtainable for field messages and reports.

2. Every precaution should be taken to assist the recipient of an order, report or message in grasping his instructions with a minimum of trouble and delay.

3. The authority who despatches a communication is responsible that proper steps are taken to ensure its safe and timely delivery. Important communications should be sent by more than one means, and acknowledgment of receipt should be obtained. Communications of a secret nature should usually be in cipher, but it must be remembered that enciphering and deciphering causes loss of time. One part of a message should not be enciphered and the remainder in clear.

ii. General Arrangement of Orders.

1. The orders of a commander usually take the form of:—
   (a) Standing orders.
   (b) Operation orders.
   (c) Routine orders.
   (d) Messages.

Special orders such as "orders of the day" will occasionally be necessary and special instructions may be required in the case of detached forces, instead of operation orders.

2. Each class of order will be prepared and numbered separately, the heading of the order indicating the class to which it belongs.

When copies of orders are prepared and distributed, each copy will be given a consecutive number, called the copy number, in addition to the number of the order.

3. Orders will be divided into numbered paragraphs, each dealing with a separate subject. The subject of each paragraph should be briefly noted in the margin.

4. Only in exceptional cases should explanations be given of what is ordered.

iii. Standing Orders.

1. The object of standing orders is—
   (a) To adapt existing regulations to local conditions.
   (b) To save frequent repetitions in operation and routine orders.

2. Unless carefully revised and kept up to date, standing orders may lead to misunderstanding. For this reason they should be confined to essentials, and added to as circumstances require.

3. The authority issuing standing orders is responsible that any alteration in them is notified to the troops, and that they are communicated to troops newly entering the command.

4. At least six copies of standing orders should be issued to each squadron, battery or company, and one to each officer.

5. Repetition of existing regulations is to be avoided.

6. The following headings for standing orders are for guidance only, and may be altered to suit circumstances:—

(a) *Marches.*—Hours of parade; rate; formations; intervals; halts; water (bottles and carts); loading of wagons; baggage guards; 1st and 2nd line transport; private carts; marching by night; bâtmen.

(b) *Duties.*—Daily duties, unit detailed for; hour of mounting; inlying piquets; fatigues; hours of retreat, tattoo, and reveille; method of issuing orders; outposts, hour of relief; signallers; advanced and rear guards (on ordinary marches only), rotation of units for.

(c) *Discipline.*—Courts martial; prisoners of war and deserters; provost arrangements; special orders with regard to treatment of inhabitants.

(d) *Camps.*—Arrival at; sanitation; latrines; refuse pits; kitchens; water; alarm posts; alarms (fire and other); parade grounds; grazing; civilians, admission of; sounding of calls.

(e) *Medical.*—Inspection of sick, hours for; disposal of arms and accoutrements of sick and wounded.

(f) *Transport and Remounts.*—Any special orders regarding.

(g) *Veterinary.*—Disposal and treatment of sick horses.

(h) *Correspondence.*—Returns; casualty reports.

(j) *Supplies.*—Special orders regarding rations and forage; mode of payment for supplies obtained locally; disposal of supplies collected; markets.

(k) *General.*—Postal arrangements; any special arrangements regarding pay or accounts. Name of map used for the campaign.

(l) *Communications.*—Special orders regarding line of; posts; railways; telegraphs.

IV. Operation Orders.

1. Operation orders deal with all strategical and tactical operations, such as marches, protection, occupation of quarters, reconnaissance, and battle. They include such information regarding supply, transport, ammunition, medical, and other services of maintenance, as it is necessary to publish to the troops; but detailed orders for such services which it is not necessary for the troops to know, should be issued only to those directly concerned.

2. An operation order should contain just what a recipient requires to know and nothing more.

3. Definite rules as to the form in which operation orders should be drafted are not laid down. The object of an operation order is to bring about a course of action, and so long as this object is fulfilled, the form of the order is of little importance. Operation orders should, however, be arranged in logical sequence and should usually be framed on the following system:—

The heading of the order will contain the class to which it belongs, followed by its number, the name of the officer issuing the orders, the force to which it refers, the number of the copy on the right-hand top corner, the date and place of issue on the right-hand side, and the map to which references are made on the left-hand side.

For example:— Copy No. 1.

OPERATION ORDER No. 28.

by

Major-General X. Commanding 1st Division.

The King's Head,

Aldershot,

Reference 1" Ordnance Map, No. 34. 10/3/1908.

The general situation should be given; this will include such information about the enemy and other bodies of one's own troops as may affect the recipient of the order. If it is not desirable to mention the source, it should state the degree of credibility with which the issuer of the order regards the information.

A brief summary of the intention of the officer issuing the orders, as far as it is advisable to make it known.

After this should follow the necessary instructions for those to whom the order is issued. The actual arrangements of these paragraphs must vary with circumstances, but it should be clear, logical, and in order of importance, so that the chief essentials are brought to mind first.*

Immediately above the signature should be stated the place to which reports are to be sent, and, when necessary, the position of the commander.

At the foot of the order, below the signature, should be noted the hour and mode of issue and the individuals to whom issued, as well as the number of the copy issued to each.

4. The information given should be strictly limited to what the recipients of the order require to know to assist them in carrying out their tasks.

5. Only so much of the intentions of the commander should be stated as it is really necessary for those to whom the order is issued to know for the purpose in view.

6. In the body of the order instructions to fighting troops should usually come first as being most important. Orders for supply, transport, medical and other services should be limited, as defined in para. 1. Any necessary instructions as regards the maintenance of communication should be given.

7. The detail of troops, giving their order in the column of march or their allotment to sections of a position, will usually be given in the margin. If a separate commander is appointed, he should be left to arrange his own order of march, and the troops placed under his command will be named in order of seniority of arms and units. In allotting the rôles to the various units the sequence for marches will usually be from front to rear, whilst in attack and defence, or outposts, it will be from right to left looking in the direction of the enemy.

8. If any portion of the force is to be detached for protective or other duties, its commander will be named in the order.

9. A point, termed the starting point, which the head of the main body is to pass at a certain time, is fixed in operation orders. By this hour the advanced guard, under orders from its commander, must be sufficiently far ahead of the starting point and so distributed as to afford the necessary protection to the main body. If troops are not all quartered together each subordinate command must arrange its own movement to the starting point so as to permit its falling into its place in the

* Particular points that should be mentioned in operation orders dealing with marches, outposts, etc., are given under these headings.

column of march without interfering with the line of march of other commands. In fixing the starting point, care must be taken that each unit reaches it by moving forward in the direction of the march.

10. Superior orders must be issued in sufficient time to enable subordinate commanders in turn to frame and distribute their own orders. If detailed orders cannot be issued till late in the evening, great inconvenience will be prevented by the issue of a preliminary order giving the time of assembly or of starting, and the issue of the detailed orders next morning. The preliminary order should state when and where the complete order will be issued.

11. Subordinate commanders in framing their orders will only embody so much of their superior's orders as is necessary. The distribution by a commander to his subordinates of copies of operation orders received by him from higher authority can seldom be justified.

v. Routine Orders.

1. Routine orders are of precisely the same nature in war as in peace. They deal with all matters not concerned with operations, such as discipline, interior economy, etc.

2. They will usually be issued daily at fixed hours—the earlier the better, and when stationary never later than noon. At these hours commanders will ordinarily send an officer to the headquarters of their immediate superior. The officer will not only receive orders, but will also be prepared to give any information regarding the command to which he belongs, which the superior may require. Watches will be compared on this occasion.

3. Routine orders not being of a confidential nature may be freely distributed.

vi. Orders for Attack.

1. Orders for an attack will be framed in accordance with the rules laid down for Operation Orders, and whenever possible should be in writing.

2. The commander of a force and subordinate commanders will be guided by the following principles in framing orders for an attack:—

(a) A definite objective or task should be assigned to each body of troops, the actual limits of frontage being specified as far as possible.

(b) The direction of the attack to be made by each body of troops should be distinctly stated.

(c) Most careful arrangements should be made to ensure that attacks intended to be simultaneous should be so in reality.

(d) The choice of the manner in which the task assigned to each body of troops is to be performed should be left to its commander.

3. Each commander who issues orders should assemble his subordinate commanders, if possible, in view of the ground over which the attack is to take place, explain his orders, and satisfy himself that they thoroughly understand their respective tasks.

vii. Orders for Night Attacks and Night Advances.

1. In framing orders for night operations, it may be necessary to deal with the following points in addition to those dealt with under "Operation" and "Attack":—

(a) Time of assembly at, departure from, and description of the position of assembly.

(b) Order of march, and formations on leaving the position of assembly. Distances and intervals. Maintenance of communication.
(c) Compass bearing of the route.
(d) Time and duration of halts.
(e) If possible, the position of the deployment should be described, and its distance from the position of assembly and from the point selected for attack notified.
(f) Formation to be adopted at the position of deployment.
(g) Special instructions for the assault and the signal for it.
(h) Short description of the ground to be crossed.
(i) Description of the position to be assaulted.
(k) Conduct of troops during the advance.
(l) Action in case the enemy opens fire.
(m) Action, after the position is captured, to resist counter-attack.
(n) Extent to which the captured position is to be fortified, and the detail of troops who are to perform this duty.
(o) Action of reserves or neighbouring troops against positions likely to enfilade the captured position.
(p) Distinctive marks and watchword.
(q) Place of the commander at the position of assembly, during the march thence, and at the position of deployment.

2. Until the troops reach the position of assembly, no more should be made known to them than is absolutely necessary.

viii. Orders for Movements by Rail.

1. The following points should be observed in drawing up orders for the despatch of troops by rail, in addition to those mentioned under operation orders:—

(a) Date and place of entraining, destination and railway route to be followed.
(b) Schedule of trains and allotment of troops, hour at which troops are to reach the entraining place, and, if necessary, the road they are to use.
(c) Special instructions regarding wheeled transport to be taken by rail, entraining and detraining.
(d) Arrangements for feeding troops and watering animals *en route*.
(e) Places of assembly near entraining and detraining stations.
(f) Special instructions regarding detrainment or off-loading.
(g) Steps to secure detrainment from surprise.

14. INTERCOMMUNICATION.

i. Responsibility for Maintaining Communication.

1. The means of communication must be carefully organized in each command, for the possibility of co-operation largely depends on constant maintenance of communication between various parts of an army.

2. All subordinate commanders are responsible for keeping their respective superiors, as well as neighbouring commanders, regularly informed of the progress of events. All commanders must arrange for communication with, and between, their subordinates; the subordinates must see that they are provided with the necessary means and must improvise the best arrangements when necessary.

3. Commanders of brigades and of larger formations, of detachments, and of any other body of troops when advisable, will establish a headquarters where messages can be received and acted on even during their temporary absence, and will notify

its position to all concerned. If a commander intends to leave the main body of his command for any length of time, he should appoint a commander, who should be provided with the necessary staff, to act for him in his absence.

4. All ranks are responsible for doing everything in their power to keep the means of communication intact.

5. Means of communication should not be used so as to cripple the initiative of subordinates by unnecessary interference.

6. Commanders in districts through which telegraph or telephone lines pass are responsible for their protection and the prevention of "tapping."

II. Service of Intercommunication.

1. The service of intercommunication is carried out by—
   i. The units of the Army Signal Service.
   ii. Intercommunication personnel forming part of other units.

2. The Army Signal Service units to be provided are—

For a cavalry division ..	A single squadron.
For a cavalry or mounted brigade.	A signal troop.
For an infantry division ..	A signal company.
With army troops ..	One or more air-line signal companies. One or more cable signal companies. One or more wireless signal companies.
On lines of communication	One or more lines of communication signal companies.

i. The personnel and equipment provided with these units for intercommunication purposes, and the duties on which the units will normally be employed, are as follows:—

Unit.	Means of signal communication available with unit.	Normal employment of unit.
Signal Squadron—		
"A" troop ..	2 wireless (wagon) stations.	Intercommunication between cavalry divisional headquarters and general headquarters.
"B" troop ..	2 cable detachments having 28 miles of cable and 8 vibrator offices.	General intercommunication within cavalry division, and to keep divisional headquarters in touch with wireless stations serving it, or with the permanent telegraph system of the country.
"C" troop ..	1 wireless (wagon) station. 3 wireless (pack) stations.	Intercommunication between divisional headquarters and brigades or contact squadrons.
"D" troop ..	12 mounted men. 28 bicyclists. 6 motor cyclists. 2 motor cars.	For visual signalling and despatch riding purposes in conjunction with other means of intercommunication.
Signal Troop with Cavalry Brigade.	11 mounted men. 6 bicyclists. 8 motor cyclists.	For visual signalling and despatch riding purposes.
	7½ miles of cable. 8 portable telephones.	For use with outposts and for making use of permanent lines in the country.

PERSONNEL, EQUIPMENT AND DUTIES—*continued.*

Unit.	Means of signal communication available with unit.	Normal employment of unit.
SIGNAL TROOP WITH MOUNTED BRIGADE.	11 mounted men. 6 bicyclists. 3 motor cyclists. 7½ miles of cable. 8 portable telephones 2 wireless (pack) stations.	All for signal troop with cavalry brigade. For intercommunication with general and cavalry divisional headquarters.
SIGNAL COMPANY WITH DIVISION.		
Headquarters and No. 1 Section.	3 cable detachments having 30 miles of cable and 9 vibrator offices. 4 mounted men. 8 bicyclists. 9 motor cyclists.	For intercommunication within the division, or as required. For visual signalling or despatch riding in conjunction with, or alternative to, the cable communication.
Nos. 2, 3, or 4 Sections.	2 telephone detachments having in all 8 miles of cable and 10 portable telephones. 8 bicyclists.	For intercommunication within the infantry brigades, or between them and the artillery. For visual signalling or despatch riding in conjunction with, or alternative to, the telephone communication.
SIGNAL COMPANY (WIRELESS).	3 wireless (wagon) stations. 9 motor cyclists.	For intercommunication between general headquarters and cavalry divisional headquarters and mounted brigades. For despatch riding purposes.
SIGNAL COMPANY (CABLE) (a).	9 cable detachments each with 10 miles of cable and 3 vibrator offices. 18 motor cyclists.	For intercommunication between general headquarters and army or divisional headquarters as required. For despatch riding purposes.
SIGNAL COMPANY (AIR-LINE) (a).	6 air-line detachments each having 10 miles of air-line and 2 second-class offices, also 24 miles of cable and 6 vibrator offices.	For intercommunication between general or army headquarters and the advanced base.
SIGNAL COMPANY (LINES OF COMMUNICATION).	100 miles of air-line and 10 offices, but equipment varies to suit local conditions.	For intercommunication on the lines of communication.

(a) The unit for employment is the *section* of 3 detachments. The headquarters of the company provides the personnel for administrative purposes at general and army headquarters.

ii. The personnel to be maintained in units other than Army Signal units, and the telephone equipment and number of bicycles provided, are as follows:—

Unit.	Personnel.	Bicycles. (e)
Headquarters cavalry divisional artillery.	7 rank and file (a)	3
Headquarters divisional artillery	7 ,, (a)	2
Headquarters cavalry divisional engineers.		1
Headquarters divisional engineers		1
Cavalry regiment	1 serjeant 18 rank and file (b)	15
A squadron of Irish Horse	6 rank and file (f)	4
Horse artillery brigade—		
Headquarters	7 rank and file (c), (d)	8
Battery	6 ,, (c)	3
Ammunition column	3 ,, (b)	3
Horse artillery battery with mounted brigade.	9 ,, (c)	3
Mounted brigade ammunition column	3 ,, (b)	1
Field artillery brigade—		
Headquaters	9 ,, (c), (d)	1
Battery	6 ,, (c)	1
Ammunition column	5 ,, (b)	1
Field artillery (howitzer) brigade—		
Headquarters	7 ,, (c), (d)	1
Battery	6 ,, (c)	1
Ammunition column	3 ,, (b)	1
Heavy artillery battery	8 ,, (c), (d)	1
Heavy artillery ammunition column	3 ,, (b)	..
Divisional ammunition column	6 ,, (b)	6
Field troop	3 ,, (b)	
Field company	3 ,, (b)	1
Air battalion	9 ,, (b)	10
Bridging train		1
Infantry battalion	1 officer 1 serjeant 24 rank and file (b)	9
Mounted infantry battalion	1 serjeant 18 rank and file (b)	15
Mounted infantry company (divisional)	6 ,, (b)	4
Cavalry divisional train		37 (g)
Divisional train		30 (g)
Army troops train		9 (g)
Mounted brigade train		9 (g)
Cavalry field ambulance		2
Field ambulance		1

(a) Includes 4 trained signallers.
(b) Trained signallers.
(c) Trained in signalling and telephonist's duties.
(d) Does not include driver for cable wagon.
(e) Provided for despatch riding and use of signallers as required.
(f) Despatch riders.
(g) For requisitioning duties and intercommunication.

TELEPHONE EQUIPMENT.

		Telephones, Portable D, Mk. II.	Cable, miles.	Remarks.
Horse Artillery Bde. Field " "	Hd. Qrs.	6	6	Carried on wagon.
Field Arty. Howr. Bde.	Battery	4	1⅔	Carried by mounted men.
Horse Artillery Battery with Mounted Brigade		4	1⅔	Carried by mounted men.
Heavy Arty. Battery	½ Batty.	4	1⅔	Carried by mounted men.
	Battery	6	6	Carried on wagon.

3. *Administration of the Army Signal Service in war.*—The Army Signal Service is administered by the Director of Army Signals, who will have representatives at the following headquarters:—

At headquarters of Inspector-General of Communications.	A Deputy Director of Army Signals.
At headquarters of an army.	An Officer i/c Army Signals.
At headquarters of a cavalry division.	The Officer Commanding Signal Squadron.
At headquarters of a division.	The Officer Commanding Signal Company.
At headquarters of a mounted brigade.	The Officer Commanding Signal Troop.

4. Capabilities of methods of intercommunication employed by field units.

Field Air-line.—Air-line is a bare wire erected on light poles. A detachment of 12 non-commissioned officers and men can erect it at the rate of about 5 miles a day.

Field Cable.—Field cable is an insulated wire laid along the ground. A detachment of 8 non-commissioned officers and men (including operators) can lay the cable at the rate of 1 to 6 miles per hour, depending on the nature of the country and for how long the cable is to remain down.

Wireless Stations.—A wagon wireless station can maintain communication with another similar station at a maximum distance of 60 to 80 miles, and with a pack wireless station about 30 miles.

Two pack wireless stations can maintain communication with each other at a maximum distance of 20 to 30 miles.

Visual Signalling.—Visual signalling is carried out by heliograph, flag or lamp.

The range of visual signalling depends upon the nature of the country and state of the atmosphere.

A rough guide in suitable weather is:—

Heliograph.—In practice the limitation is the intervisibility of stations.

Flags.—3 to 7 miles.

Lamp.—Limelight, 10-15 miles.

Begbie, 5-8 miles.

Despatch Riding.—Horses, bicycles, motor cycles and motor cars may be used, the rate of travel depending on the nature of the roads and their freedom from traffic.

III. SIGNAL TRAFFIC IN THE FIELD.

1. No communication is to be sent by signal* or despatch rider, when transmission by post would serve the purpose.

* The term signal includes telegraphs, telephones, and balloon or visual signals.

2. Signal messages are despatched in the order in which they are handed in, except that messages of special importance will be given precedence, if authorized by an officer who has power to do so.

The order of precedence of messages is indicated to telegraphists and signallers by the "Prefix" which is written on each message at the "Office of origin."

The following is a list of the prefixes employed in all branches of the signal service. Messages will be despatched in the order of precedence of their prefixes.

Messages to be Delivered at Receiving Station.	Messages to be Transmitted at Receiving Station.	Class.
D S	D X	Signal Service messages requiring immediate attention. (To be marked "Urgent Signal.")
S A	X A	Military Railway Service messages requiring immediate attention. (To be be marked "Urgent Railway.")
S B	X B	Messages "O H.M.S." marked "Priority."
S G	X G	Signal Service messages.
S M	X M	Messages "O.H.M.S." not marked "Priority."
S	X	Private messages.
S R P	X R P	Reply paid messages.
S P	X P	Press messages
		Equal as regards precedence.

4. Officers in charge of the signal arrangements are alone empowered to send "Signal Service messages requiring immediate attention." They should never do so unless such a course is absolutely necessary. Authority will be deputed to certain officers to send "Military railway messages requiring immediate attention."

5. No one but the commander on the spot, or an officer expressly authorized by him, is to frank a message "Priority." Authority to frank a message will be sparingly delegated, and the number of "Priority" messages must be kept at a minimum. The names of officers having this authority will be supplied to the local signal stations and published in local orders. In these cases, the officer who authorizes the message, will write the words "Urgent Signal," "Urgent Railway" or "Priority" as the case may be, in space Z, which must be signed.

6. Any officer who has not authority to send "Priority" messages may, under urgent circumstances, order a message to be sent thus, but he will be held responsible that the urgency is sufficient to warrant such action.

7. Messages, other than those already referred to in this section, must be signed by one of the following officers:—

(a) A commander.

(b) An officer of the staff.

(c) The head or representative of an administrative service or department.

(d) An officer holding a special appointment.

(e) The signaller in charge of a station. ("S.G. or "X.G." messages only).

(f) In the case of "Press Messages" special instructions will be issued.

8. A message in course of transmission will never be interrupted, if this can possibly be avoided. Telegraphists and signallers will use their discretion in stopping work on a message in order to deal with one of a higher prefix, taking the following points into consideration, viz.:—the lengths of the messages, their importance, and how near they are to the end of the message; press and private messages must never be allowed to delay messages O.H.M.S. This applies to a message that is being received as well as to one being sent.

9. Officers only will be permitted to send messages in code or cipher, which must always bear their signature, rank, and appointment.

10. Special arrangements will be made by the general staff regulating the censorship and despatch of private or Press messages. They will not be accepted unless the opening of the station for that purpose has been duly authorized and notified.

See also F.S. Regs., Part I, Chapter II, Section 18.

11. All Signal Stations should be in possession of copies of the following:—

(a) Order giving the names of officers entitled to send "Priority" messages, with any amendments, which may have been published.

(b) Order prohibiting unauthorized persons (officers or otherwise) loitering in the vicinity of stations.

(c) Order requiring all messages to be either written or dictated, and to bear the signature of the addressor or his deputy.

iv. Messages.*

1. Messages intended for the headquarters of units and formations will be addressed by the title of the unit or formation in an abbreviated form, *e.g.*, 1st Div., 7th Inf. Bde., 2nd F.A. Bde. The abbreviation H.Q. will only be used in addressing general headquarters.

Only abbreviations about which there can be no doubt are to be used.

In the case of administrative commanders the following abbreviated addresses will be used:—

* These instructions are at present provisional.

Administrative Commander.	Abbreviated Address.
Director of Army Signals	D. Sigs.
" Supplies	D.S.
" Ordnance Services	D.O.S.
" Transport	D.T.
" Railway Transport	D R.T.
" Works	D.W.
" Remounts	D. Remounts.
" Veterinary Services	D.V S.
" Medical Services	D.M.S.
" Postal Services	D. Post.
Deputy Judge Advocate-General	Dep. J.A.G.
Principal Chaplain	P.C.

2. After the address the number of the sender's message will be given, followed by the day of the month.

If the message is in reply to, or has reference to, a message from the address_e the number of that message will then be quoted. The body of the message will come next. The message will end with the abbreviated title of the sender's unit or appointment, as in paragraph 1, followed by the place and time of despatch.

3. When the message is complete it will be signed, the rank, appointment and force being stated, in the right-hand bottom corner. If the message is despatched by signal this signature is not transmitted, but is the authority for despatch.

4. Messages will be written, whenever possible, on Army Form C 2121, which is provided with spaces for the particulars prescribed in the foregoing paragraphs.

5. If a message to be transmitted by signal is to be delivered to more than one addressee it facilitates despatch if separate copies for each addressee are handed in to the signal office.

6. When the sender desires to inform different addressees that an order has been circulated, this information will be included in the text of the message, thus—

Addressed (the unit or units to which the order is sent). Repeated (the units who are to be informed that above order is being given). When information has been sent by another and independent route to another unit, the message will contain at the end of the text "(unit) informed."

7. In signal messages important numbers should be written in words. The use of Roman numerals is forbidden. Complicated phrases are to be avoided. The letters AAA should be used for a full stop; the word "stop" should not be used to indicate punctuation as it may affect the sense of the message. Other ordinary signs of punctuation, inverted commas, brackets, &c., can be signalled and when used should be clearly shown in the message. Signal messages must be as short as possible consistent with clearness.

When letter ciphers or important words such as "not" are used they should be written in block letters, letter ciphers being arranged in groups of five letters.

"A" Form. Army Form O 2121.

MESSAGES AND SIGNALS No. of Message.....

Prefix..... Code.....m.	Words.	Charge.	This message is on a/c of:	Recd. at.....m.
Office of Origin and Service Instructions.			.....Service.	Date .....
.....	Sent.			
.....	At.....m.			From .....
.....	To.....		.....	
.....	By.....		(Signature of "Franking Officer.")	By.....

TO			
Sender's Number.	Day of Month.	In reply to Number	AAA
From..... Place..... Time.....			

The above may be forwarded as now corrected.	(Z)
..... Censor.	..... Signature of Addressor or person authorized to telegraph in his name.

* This line should be erased if not required.

v. Signalling Codes.

1. Morse Alphabet.

A	· —	N	— ·
B	— · · ·	O	— — —
C	— · — ·	P	· — — ·
D	— · ·	Q	— — · —
E	·	R	· — ·
F	· · — ·	S	· · ·
G	— — ·	T	—
H	· · · ·	U	· · —
I	· ·	V	· · · —
J	· — — —	W	· — —
K	— · —	X	— · · —
L	· — · ·	Y	— · — —
M	— —	Z	— — · ·

2. NUMERALS.

1	- —	6	— - - -
2	- - —	7	— — - - -
3	- - - — —	8	— - -
4	- - - - —	9	— -
5	-	0	—

3. LONG NUMERALS.

1	- — — — —	6	— - - - -
2	- - — — —	7	— — - - -
3	- - - — —	8	— — — - -
4	- - - - —	9	— — — — -
5	- - - - -	0	— — — — —

4. SPECIAL SIGNALS.

	MORSE.	SEMAPHORE.
Full Stop	- — - — - —	A A A
Inverted commas	- — - - — - —	R R
Parenthesis or Brackets	— - — — - —	K K
Underline	- - — — - —	U K
Oblique stroke	- — - - —	L T
Horizontal bar	— - - — -	N R
Hyphen	— - - - - —	N V
Break	— - - - —	i i
A A A	- — - — - —	A A A

Used to separate the Sender's number, Date, and In reply to Number, from the text of a message.

5. Long Numerals are used when working with the Royal Navy, and in telegraphy. In Army signalling Numerals are used.

6. As will be seen certain of the numerals have the same symbols as some of the letters of the alphabet. In order to distinguish between these, before signalling a numeral, or group of numerals, the signal FI (figures intended) will be sent. For the same reason, on the conclusion of the numerals and before resuming letters, the signal FF (figures finished) will be sent.

7. When signalling words, the context is, as a rule, a guide that the letters have been correctly read, but this is not the case with figures, and consequently it is necessary that they be verified. This is done by the "check," in which the figures

1 to 9 are denoted by the first nine letters of the alphabet, and 0 is denoted by K thus:—

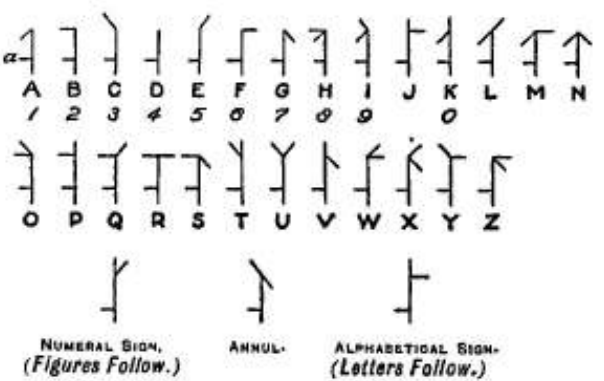
A for 1	F for 6
B " 2	G " 7
C " 3	H " 8
D " 4	I " 9
E " 5	K " 0

8. On receiving a group of numerals the corresponding letters are signalled back.

For example, 1 is checked by A.
12 " " AB.
123 " " ABC.
4210 " " DBAK.

9. In signalling (except when using the Semaphore system) each word or group is acknowledged before sending the next; with certain exceptions (as in the case of the numerals) the "general answer," i.e., one dash, is employed for this purpose.

10. Semaphore Alphabet, Numerals and Special Signs.

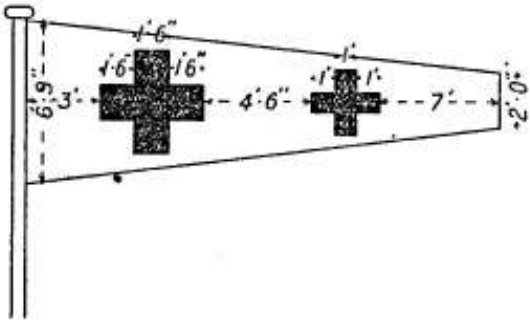


The small arm at *a* is called the "Indicator," and shows the side from which the Alphabet or signs commence; the signaller, when working a fixed semaphore, is sometimes not visible, and the indicator is necessary because his back may be toward the reader. It also often happens on board ship that a semaphore signal is being read from both sides at the same time, and unless the indicator was used the reverse letters might be read, *e.g.*, K for V.

vi. Inter-Communication between Army and Navy.

1. *Special Signals for opening communication.*—Two special signals are established for distinguishing inter-communication between the two services when wishing to call one another up, viz.:—

(a) *By day.* The "Naval and Military Pendant," which is white with two black crosses as shown below. This is always to be used by H.M. ships wishing to communicate with a shore station, or by a shore station, equipped with a flagstaff and possessing this pendant, wishing to attract the attention of one of H.M. ships.



Naval and Military Pendant.

The above must not be confused with the "Negative Flag," sometimes used by H.M. ships between themselves. The latter is a white square flag with five "black crosses on it."

(b) *By night or by day.* The "Military Sign," which is the letter X made either by Morse or Semaphore. This sign is invariably to be used at night, and during daylight by stations which have no flagstaff or military pendant available.

15. FIELD INTELLIGENCE.

1. Information is acquired in the field principally by:—

(a) Reconnaissance.
(b) Examination of inhabitants, prisoners, deserters or papers.
(c) Intercepting messages.
(d) Secret service.

Of these, reconnaissance is of most importance.

ii. Reconnaissance.

1. Reconnaissance is the service of obtaining information with regard to:—

(a) The topographical features and resources of a country.
(b) The movements and dispositions of an enemy.

In the latter case it may be strategical, tactical or protective.

Strategical reconnaissance is required, before the opposing armies are within striking distance, to locate the hostile columns, and ascertain their strength and direction of march.

Tactical reconnaissance is required, when two forces are within striking distance, to discover the tactical dispositions of the opposing force.

It is one of the most important duties of the protective cavalry, supported by the advanced guards of columns and sometimes by additional infantry and artillery.

2. While the advanced troops are engaged with the enemy, information may also be obtained—

(a) By personal observation on the part of a commander.
(b) By general staff and other officers, patrols or scouts.

Protective reconnaissance is required by every force at all times to ensure its security against hostile enterprises and to prevent the enemy gaining information.

3. Information may be gained by personal observation of the enemy; by questioning the inhabitants, prisoners and others; by reading signs, such as tracks, dust, fires, deserted camp-grounds, uniforms; or by tapping telegraph wires, taking letters and newspapers from post offices, telegrams and telegraph registers from telegraph offices, registers of despatches from railway stations, &c.

4. In questioning prisoners, or hostile inhabitants, it is well to take them separately out of hearing of others, to let them suppose that a great deal more is known by the questioner about the enemy than possibly is the case, and that questions are being put merely with a view to seeing whether they are speaking the truth or not, the answers being known. The examination should, if possible, be carried out by more than one person.

5. People not accustomed to seeing large numbers of troops are very apt to exaggerate their strength, a point which a scout should be careful to avoid. Information as to the uniforms of the enemy, number of regiment on the buttons or badges, &c., may be of great use.

A scout should know what are the usual formations of the enemy, and what are the usual strengths of his different organizations of troops.

6. If troops are moving along a road or defile, they may be timed while passing a certain point. For each minute, the following numbers would approximately go past:—

Cavalry at a walk, in sections	120
Cavalry at a trot, in sections	240
Artillery guns, or wagons, at a walk	5
Infantry, in fours	200

7. The following signs should be noticed as affording information:—

Clouds of dust show movements of troops, or baggage, or cattle, &c. Cavalry raises a high light cloud. Infantry and vehicles a lower denser cloud. Motors, moving rapidly, a thick, high and continuous cloud. In some countries, it is customary to set fire to grass or bush so that the smoke may hide the dust of a movement.

Fires.—In many countries it is customary to light signal fires, to send up a flare by night, or puffs of smoke by day. This latter is done by lighting a damp fire, and alternately covering it with a blanket and uncovering it.

They may sometimes be used with advantage by our own look-out posts, scouts, &c.

The enemy's bivouac fires should be located, and counted in the evening or early morning. It is a common practice to light dummy fires to deceive the enemy's scouts.

Tracks.—Much information can be gained by a good tracker from observing tracks on the ground.

Tracks give warning of enemy's patrols being about; show the formation, direction, and speed of his force, and almost the hour when the force passed by, by the marks of the feet, hoofs, wheels, &c.

Every scout, to be really efficient, must be an expert tracker.

Sounds.—Sound travels at the rate of about 380 yards per second. Four beats of the pulse to 1,000 yards is a fair rough calculation.

The sound of the explosion overtakes the modern pointed bullet at about 2,000 yards. A double report is heard when the bullet is fired by someone exactly facing the hearer.

Since much of a scout's work has to be done at night, it is necessary that he should not fail to make every use of his senses of hearing and of smell, as well as of sight.

8. In Egypt, Africa, India, &c., heat vapour often causes curious effects on the appearance of open country, lakes appear where there is no water, trees look like mountains, cattle like cavalry, and so on. These are very liable to deceive a scout who is not accustomed to them.

iii. Reconnaissance Reports.

1. To obtain satisfactory results it is essential that the reconnoitring officer should be given a clearly defined task, which should be within his powers to perform.

2. In drawing up his report the reconnoitring officer should be as concise as possible and should be careful to confine his information to what is relevant.

3. The most satisfactory method is to divide the report into two parts. The first part should contain a general description of the outstanding features of the reconnaissance, to enable the reader to get a grasp of the subject without having to wade through a mass of detail. The second part should contain the details in tabular form. For the same nature of reconnaissance (road report, river report, &c.) the headings in Part II. should usually be the same: those in Part I. however, should be varied according to the tactical object of the reconnaissance. The disadvantages of a cut and dried form are counterbalanced by the greater ease with which items of information can be turned up or reports collated.

4. Where the names of foreign places or towns are spelt in various ways, the anglicised form should be used, followed by the local form in brackets.

5. Care should be taken to distinguish between what are impressions or hearsay only, and what are facts.

It is important to know the time of year when a reconnaissance is made.

iv. Road Reconnaissance.

1. The information should supplement that given on maps and not repeat what is already shown.

2. The information should be definite, *e.g.*, it is not enough to know that animals can be watered in a stream, but the numbers for which there is room, its depth, etc., must be given.

3. *Tactical Information.*—Definite information is specially important when tactical questions are dealt with. Thus it is not sufficient to say that a certain ridge forms a defensive position. Information on the following is usually required: limits of the position and force required to hold it; nature of ground in front and flanks, and of soil for digging; localities which would form strong defensive points, artillery positions, own and enemy's; what the view is like, points from which an extended view is obtainable and the average field of fire; best lines of attack and counter-attack; communications and water.

In order to make a good tactical reconnaissance it is advisable, before starting, to find out with what "special idea" the reconnaissance is to be undertaken.

4. *Road Details.*—Roads should not be classified solely by their width. The surface condition and material for repair must be considered. The ease with which troops can deploy from them is important. The nature of the fences or ditches enclosing the road should be mentioned.

5. *Gradients.*—Only such gradients should be mentioned as will affect the rate of marching.

6. *Bridges.*—It is not necessary to give details of every culvert, but bridges of any importance should be fully reported on. It is important to know if a bridge will bear mechnical transport. The type of bridge, material, length, width, height above ground or water, parapet and approaches should be noted.

7. *Turnings.*—Mention turnings only when they present some difficulty, *e.g.*, through a town where the names of the streets should be given.

8. *Observation Points.*—Places from which a view can be obtained should be noted, with the direction and extent. The names of distant objects that can be identified should be mentioned, such as churches, country houses, &c.

9. *Local Administration.*—System of local administration should be noted; the identity of any individual who does all the work or wields all the power should be established.

10. *Supplies.*—For a thorough report on a district an expert is almost essential, but much useful information can be obtained by the non-expert without going into too great detail. Enquiries in the towns will produce better results in a shorter time than visiting a large number of farms.

In the former seek for flour mills and find out the normal amount of grain kept in stock. From the butchers ascertain if the locality is self-supporting, or if much frozen meat is brought in. For groceries find out the biggest firms and ascertain at what intervals of time stocks are renewed; the date of the last order will show how long present stocks will last. Find out how many rations of tea expressed in ½ oz. and of sugar in 4 oz. he has in hand; the lower number of the two divided by the number of days the stock is estimated to last will give the approximate number of customers. This enables number of grocery rations obtainable to be estimated, as other groceries

are usually present in sufficient quantities. For further notes on supplies see pp. 130-135.

PART II.

Place.	Distance in Miles.		Details of Road.	Remarks
	Intermediate.	From		

v RIVER RECONNAISSANCE.

1. Owing to the variety of tactical uses to which a river may be put, the particular object of the reconnaissance should be ascertained before starting, and the report drawn up accordingly.

2. The headings in Part I will vary according to the tactical object, those in Part II, which contains nothing but facts about the river, need not vary.

3. The velocity of a river can be found by throwing a piece of wood well out and timing it over a measured number of feet. Mean velocity = $\frac{8}{9}$ surface velocity. $\frac{7}{10}$ mean velocity in feet per second = number of miles per hour.

4. Ice 3 inches thick will bear men in small detachments; 6 inches thick, horses and carts; 9-12 inches thick, wagons and guns.

HEADINGS FOR PART II.

Crossing.	Details.	Fit for Mechanical Transport.	River.			Quays.		Boats and barges usually available.	Approaches.		Remarks.
			Breadth yds.	Depth ft.	Velocity m. per hr.	Right bank.	Left bank.		Right bank.	Left bank.	

vi. RAILWAY RECONNAISSANCE.

1. It should be borne in mind that an expert would be required to write an adequate report on which to work a railway.

2. *Stations.*—In ordinary circumstances a rough sketch of the stations, on which the following information was shown, would suffice:—The approaches; number of lines; cross-overs; number, length, breadth and height of platforms; number and length of sidings; water; turn-tables; end-loading and other ramps; goods sheds, lighting.

3. *Forming-up Places.*—Places suitable for forming-up troops before entraining or after detraining, with their area, approaches, water supply, etc., should be reported.

4. *Track.*—As regards the line itself, the gauge, any unusual gradients, type of fuel used, any triangles, and details of any bridges of importance should be noted. In case of a single line the distance between crossing places.

vii. Billeting Reconnaissance.

1. In reconnoitring areas for billeting purposes the population of the town, village or parish, whichever is available, must be taken as the basis of calculation. In addition to estimating the number of men per inhabitant that can be accommodated, the number of vehicles per inhabitant should also be given.

2. Billets without subsistence can be provided at varying rates.

The best class of village in a rich agricultural district will take up to 10 men per inhabitant; a residential town or village with good houses and wide streets about 5 men per inhabitant; while industrial towns with a dense population and a poor type of house will take still fewer.

3. There are various questions affecting billeting, such as supplies, railways, etc.: as a rule, these subjects should be treated generally in Part I of the report, details only being given when particularly required.

4. Particular care should be paid to giving details concerning the water supply, any large buildings, such as schools or country houses, which will accommodate a considerable number of troops, and any open spaces where troops can collect or vehicles be parked.

5. In many civilized countries chief officials of localities keep detailed lists showing billeting accommodation. Efforts should be made to obtain these.

6. In a billeting report based on the population of each parish, the small hamlets in each parish should be mentioned by name, as well as the parochial headquarters.

Part II.

Name of Parish, Town or Village.	Pop.	Billets.			Nature of surrounding country.	Water Supply.	Railways.	P.O.		Supplies.	Remarks.
		Men.	4-horse vehicles.	6-horse vehicles.				Tel. O.	Tph. O.		

viii. Hints for Commanders of Patrols.

1. Make sure that you understand what you have to do, *i.e.*, how far you have to go, and what you are to look for. A patrol commander should, as far as possible, make up his mind beforehand what he will do in various circumstances.

2. Patrols are not sent out with the primary object of fighting. Therefore do not fight if you can gain your object without doing so, but remember that if you suddenly meet small parties of the enemy the assumption of a resolute offensive may be the best course of action.

3. Take precautions against surprise, do not move or enter a village, copse, etc., in one compact body.

4. If your patrol is cut off, its members must make every effort to get away, so that at least one may arrive back with the information already gained. For this reason, every member of a patrol, while advancing in an enemy's country, must take notice of landmarks and distances as he goes along, so as to be able to find his way back. When advancing look behind you from time to time, so that the appearance of the country may be familiar to you.

5. When touch with the enemy is gained, do not be in too great a hurry to send back a man to report. Remember the number of messengers available is small and that as much information as possible must be conveyed by each man you send.

If the enemy is not found where he was expected, information to this effect should be sent back.

6. Avoid drawing attention to the movements of your patrol, *e.g.*, keep off the roads and in shadow as much as possible, cover up anything that will reflect the sun, avoid crest lines, etc.

7. Remember that to go and return by the same road may lead to being ambushed.

8. Do not halt all in one spot. Have men out watching the approaches. In the case of a mounted patrol the horses must not all be off-saddled at the same time.

9. In sending a written report think over what you want to send before commencing to write. Be accurate as regards your statements concerning places, hours, numbers. Don't waste time in writing a long story.

A verbal report should be as far as possible in the same form as a written report. Make your messenger repeat the message before he leaves.

ix. Reconnaissance of a Position.

In the Attack.

1. In reconnoitring a position on which an attack is contemplated, definite information will rarely be obtained without fighting, except by special agents, since it will be necessary to drive in the enemy's covering troops. The troops engaged in this task will often have opportunities for acquiring information of value to the commander of the force and reconnoitring parties may be attached to them for this purpose. It will rarely be possible for one party to obtain all the information about a position which is wanted. Definite instructions should be issued by the commander of the force to each party employed on reconnaissance work.

2. In the future airships and aeroplanes may facilitate these reconnaissances; but it must not be forgotten that the enemy will himself possess aircraft which must first be defeated and that aerial observers are liable to make mistakes, or to be misled by the enemy.

3. The following are the chief points on which information is desirable:—

(a) The general front of the position so far as it can be ascertained. The probability of advanced troops covering the real position will have to be considered.

(b) Points from which a good view of the country occupied by the enemy can be obtained.

(c) Localities to which the enemy is seen to be devoting attention, and any others which would appear likely to be of special tactical value to him. The position of any trenches, obstacles, etc., that can be located should be carefully noted.

(d) Lines which afford the attack most cover during their advance and which offer facilities for covering fire, both from guns and rifles, where it is exposed to hostile view and fire.

(e) Tactical points on the above lines of advance and elsewhere, the possession of which will favour the development of superiority of fire over portions of the enemy's position.

(f) The manner in which the flanks are secured, whether they rest on natural obstacles or whether there are any indications of supporting troops and works echeloned to the rear.

In the Defence.

4. When it is intended to occupy a defensive position, with a view to subsequent offensive action, the chief points to be noted are:—

(a) The extent of the position, the localities of special tactical importance in it and the means of securing the flanks.

(b) The minimum force necessary to occupy the position.

(c) The positions for the artillery and for the infantry firing lines. These should be considered together, so that the best use of the ground may be made.

(d) The best line or lines for the counter attack.

(e) The most favourable lines for the enemy to attack on, and positions from which his artillery can best support such attacks.

(f) Any tactical localities, the possession of which might enable the enemy to develop superiority of fire against some part of the position.

(g) Any advanced position, the occupation of which might have the effect of misleading the enemy and forcing him to a premature deployment.

16. PROTECTION.

1. Every commander is responsible for the protection of his command against surprise. A force can only be regarded as secure when protection is furnished in every direction from which attack is possible.

The commander of each protecting detachment, wherever situated, must keep his command at all times ready for action.

2. The mounted troops of an army form the first line of protection.

3. Local protection on the march is afforded by *Advance, Rear* and *Flank Guards*, and when at rest by *Outposts*.

The strength of the Adv. Gd. may vary from a fourth to an eighth of the whole force, and should be detailed as far as possible from a complete unit. It is divided into (a) Van Guard; (b) Main Guard. As it has to reconnoitre and fight, it will usually be composed of all arms, the proportion of each depend-

ing chiefly on the character of the country. In an open country, the proportion of mounted troops and guns may be much greater than in a close or mountainous country.

ii. Outposts.

1. Every body of troops when halted will be protected by outposts, in order that it may rest undisturbed.
2. The duties of the outposts are:—
   (a) To provide protection against surprise.
   (b) In case of attack, to gain time for the commander of the force to put his plan of action into execution.
3. If an enemy is so continuously watched that he can make no movement without being observed, surprise will be impossible. The first duty, therefore, of the outposts is RECONNAISSANCE.
4. All partial attacks must be warded off, and the enemy's troops must be prevented from approaching within effective field artillery range of the main body when deployed. The second duty, therefore, is RESISTANCE.

Outposts of a force of all arms will usually consist of outpost mounted troops, outpost companies, and, when necessary, the reserve. Machine guns will generally be included, and sometimes artillery.

5. Only three rules can be laid down as regards strength:—
   (a) Outpost duty is most exhausting. Not a man nor horse more than is absolutely needed should be employed.*
   (b) In enclosed country, the movements of troops being generally confined to the roads, it will usually be sufficient to hold the roads by which the enemy may approach in strength, and to observe the intervening country.
   (c) The power of resistance of the outposts must be sufficient to delay the enemy's attack until the main body has had time to get ready to defend itself.

iii. Commander of Outposts.

1. The commander of the outposts should be told, before the force has halted
   (a) What is known of the enemy, and of other bodies of our own troops.
   (b) The intentions of the commander who appoints him, if the enemy attacks.
   (c) Where the force to be covered will halt.
   (d) The general position to be occupied by the outposts.
   (e) Whether there are other outpost troops on his flanks.
   (f) The composition of the outposts and the hour at which they will be relieved.
2. He will then give out such orders as are immediately necessary for the occupation of the outpost line and will supplement this by detailed orders on the following points as soon as possible.

iv. Duties of a Commander of an Outpost Company.†

1. Move his command to the ground covered by scouts.
2. Halt under cover, holding a line in advance of the position for the piquets.

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* If more than one-sixth of the force is employed, the efficiency of the troops will suffer.

† Applies also to squadron when doing the work of outpost company, *e.g.*, with mounted troops acting independently

3. Examine the ground, decide on the position of the support and piquets. Choose the position primarily with a view to defence. The defensive line corresponding, if possible, with piquet line should support and be supported by adjoining companies.
4. Move troops into position and put out groups of sentries, send out patrols, and withdraw covering troops.
5. Give instructions to commanders of piquets and detached posts regarding action in case of attack, etc.
6. Patrols should examine the country in front and communicate with troops on each flank, ascertaining their dispositions.

V. Duties of a Commander of a Piquet.

1. Read orders to piquet, explain direction of enemy, position of support and of other piquets, action in case of attack by day or night, whether there is any cavalry in front, and line of retreat.
2. Tell off piquet, post groups or sentries, and send out patrols.
3. Satisfy himself that sentries are alert and understand their duties.
4. Strengthen post as far as possible, make sanitary arrangements.
5. Take ranges of important objects.
6. Not allow men to take off accoutrements.
7. If the sentries are relieved from the piquet, carry out the reliefs so that the enemy cannot ascertain the position of the outposts, and see that reliefs are saved needless marching.
8. *Outpost companies* are divided into supports, piquets, sentries (or groups), patrols, and, in some cases, detached posts.
9. *Supports* must keep up communication with their piquets, with the supports on either flank, and with the reserve. They should consist of a complete command.
10. *Sentries* are posted in groups, consisting of 3 to 6 men, or in pairs.

A sentry must understand clearly:—

(a) The direction of the enemy.
(b) The extent of frontage, and any special points he is to watch.
(c) The situation of the sentries on his right and left.
(d) The situation of his piquet, and the best way to it.
(e) The situation of any detached posts in the vicinity.
(f) How he is to deal with persons approaching his post.
(g) The names of villages, rivers, &c., in view; and the places to which roads and railways lead.

11. *Patrols* are:—

	Duties.	Numbers.
(a) Reconnoitring—	To search the country in front of the outpost position or to watch the enemy if in close touch.	2 to 8 men, under a N.C.O.
(b) Standing—	To watch particular points, approaches, etc.	2 to 8 men, under a N.C.O.

Detached posts consist of 6 to 12 men under a N.C.O., but may be stronger. They are used to watch the flanks or places where the enemy might collect, but should not be employed except in case of necessity. They should act in the same manner as laid down for piquets.

12. *Mounted piquets* have the same components as outpost companies, but:

Sentries are called Vedettes.
Groups are called Cossack posts.
Vedettes as a rule dismount.
Cossack posts.—The reliefs dismount, but no man should offsaddle or unbridle his horse. Feeding and watering carried out one-third at a time.

13. *Traffic through the outposts.* No one other than troops on duty, prisoners, deserters, and flags of truce will be allowed to pass through the outposts, except with the authority of the commander, who details the outposts, or of the C. in C. Inhabitants with information will be blindfolded and detained at the nearest piquet pending instructions, and their information sent to the commander of the outposts. Only authorized commanders are allowed to speak to persons presenting themselves at the outpost line. Prisoners and deserters will be sent at once to the commander of the outposts.

If no piquet is posted on a main line of traffic, a detached post should be placed there specially to deal with traffic through the outposts. It will be detailed by the commander of the outpost company.

A flag of truce will be halted at a distance from the outpost line until instructions are received from the commander of the outpost company. If permitted to pass the outposts, the individuals must be blindfolded and escorted to the commander of the outposts. If a letter or parcel is merely being brought, the commander of the outpost company must instantly forward it to headquarters, furnish a receipt and forthwith require the party to depart. No conversation is to be allowed in the outpost line with the bearers of a flag of truce.

17. OVERSEA OPERATIONS.

1. Oversea operations may be undertaken with a view to:—
   (a) The establishment of a base for military operations either against the enemy's field armies or against a coast fortress.
   (b) The establishment of a flying naval base.
   (c) Raids against shipping, communications, &c.

2. Combined naval and military operations may be either offensive, when the navy assists the army in the capture of a fortress or locality near the sea, or when the navy secures and arranges the landing of a force in hostile territory; or defensive, when for example the navy secures the flanks of a position taken up by the army on an isthmus.

3. The success of oversea expeditions demands as a first postulate the command of the sea. In making use of this term it is not considered desirable to lay down any precise definition as to when this condition may be considered to have been obtained. It is sufficient to state that the naval situation will be such that the navy are willing to recommend the despatch of an expedition, and that such a decision on their part does not necessarily imply that the maritime communications would be absolutely secure against any interruption whatever.

4. The most important function of the navy in connection with a combined operation is the preservation of command of the sea, and whether it is preferable that the principal naval force shall be actually in company with the convoy or be dis-

posed elsewhere is a matter for the decision of the navy having in view the general strategical situation afloat.

5. No standard can be laid down for the strength of the naval escort to the transport. The only essential is that the escort shall consist of sufficient ships to control the transports while in transit, and to provide the necessary boats and personnel for the conduct of the disembarkation.

6. The navy is responsible for the provision, despatch and control of the sea transport of an army and for its security while at sea. The navy also maintains the communications of the army by sea.

7. The entire operations of landing and embarking troops, animals, guns, regimental stores and baggage, and stores (cargo), whether alongside wharves or piers (either government or mercantile), or to and from a beach, will be controlled by the navy, who will provide the boats, lighters, and tugs, and any labour required in connection with same. All other necessary labour will be found by the army, except when circumstances render it desirable that the navy should provide some or all of the labour. The ultimate decision on this point will rest with the naval authorities.

8. The navy will be responsible for the berthing of all ships, lighters, tugs and boats, but the convenience of the army must be considered, as far as practicable, in the positions allotted. In landings and embarkations the navy will have full control of the entire beach up to high-water mark, and of such further portions of the same and of such piers and wharves as may be considered necessary to enable them to control the work of embarkation and disembarkation. Within these limits the military officers will carry out all instructions issued by the naval commander, but beyond them the responsibility for the safety and transportation of men, animals, guns, vehicles, and stores on shore will rest with the army.

Should circumstances prevent the provision of the full naval personnel contemplated under the distribution of responsibility indicated above, the army will be prepared to undertake such duties as the respective naval and military commanders may arrange to allot to it, with the exception of control of movements when afloat.

9. While the foregoing are the general rules regarding the division of duties between the navy and army, it is to be understood that each service is working for a common object, and will render the other all the assistance that lies in its power. The complicated duties of embarking and landing troops and stores can only be carried out successfully so long as perfect harmony and co-operation exist between the naval and military authorities, and the staff duties devolving on both services have been carefully organized and adjusted.

A. *Definitions.*

When combined naval and military operations take place special duties, involving the use of unfamiliar titles, will devolve on officers of both services. These definitions explain the meaning with which the following terms are used in such circumstances:—

Principal Naval Transport Officer.—A flag officer or Captain Royal Navy appointed, in charge of Sea Transport duties, to assist the Senior Naval Officer in preparing the necessary naval orders and under his direction to conduct the disembarkation, &c.

Divisional Transport Officer.—A naval officer responsible for

the efficient working of the transports and boats of the division under his charge.

Sub-divisional Transport Officers.—Naval officers appointed to assist the Divisional Transport Officer.

Naval Transport Officer.—A naval officer responsible to the Divisional Transport Officer for the safe and rapid discharge of the transport to which he is appointed, and the medium of all communications between the master of the ship and the officer commanding the troops on board.

Military Transport Officer.—A military officer appointed to co-operate with the Naval Transport Officer.

Principal Military Landing Officer.—A military staff officer appointed to assist the Principal Naval Transport Officer.

Beach.—The stretch of shore allotted for the disembarkation of troops and material from one or more transports.

Beach Master.—A naval officer responsible for the rapid and safe clearing of the boats of the division of transport to which he is appointed.

Military Landing Officer.—A military officer appointed to assist the Beach Master.

Forming-up place.—A place of assembly for the smaller units, clear of but close to the beach to which troops proceed directly they land.

Rendezvous.—A place of assembly for the larger units to which the smaller units proceed from the "Forming-up place."

Covering Position.—A position to be occupied by an advanced detachment of troops at such distance from the selected landing that neither anchorage, beach, nor forming-up place are exposed to shell fire from the enemy's land forces.

A tow.—The number of boats, barges, or lighters, secured to one another, that can be towed by one steamboat.

A trip.—The passage of a tow from a transport to the landing place.

A round trip.—The time taken to load, tow ashore, and unload a tow, as well as to return to the transport in readiness for the next trip.

B. *Naval Terms.*

When naval and military forces are associated in combined operations all military ranks must be made familiar with the meaning of the following naval terms:—

A ship or a boat is divided lengthwise into the *fore part*, or *bows*; *midships*, or *waist*; *after part*, or *stern*.

The right is the *starboard*, the left the *port* side, looking forward.

Forward.—Towards the bows.

Aft or *abaft.*—Towards the stern.

Fore and aft.—Lengthways of the vessel.

Thwartships.—Across.

Alongside.—By the side.

Foc'sle.—In the fore part of the ship.

Quarter-deck.—A portion of the deck reserved for officers.

Accommodation ladder.—A ladder-way or staircase for entering a boat lying alongside a ship and *vice versâ*.

Gangway.—A term indicating passage way.

Gang board or gang plank.—A special form of gangway for embarking or disembarking on or from a boat on an open beach.

Sea gangway.—The gangway used when the ship is at sea.

Gunwale.—A term used in a general way for the top of the sides of a boat.

Freeboard.—The distance between the water and the gunwale.

Lanyard.—A short piece of cord for tying on a knife, oar, &c.

Thwarts.—Seats for rowers in a boat.

Stretchers.—Rests for feet of rowers.

Stern sheets.—The space between the after thwart and the stern fitted with seats for passengers and steersman.

Rowlocks.—That part of a boat's gunwale in which the oar rests in rowing.

Poppits.—Pieces of wood which fit into the rowlocks when the boat is under sail.

Crutch.—A metal swivel rest for the oar to fit into when rowing, they are usually removable but secured to the boat by a lanyard.

Halliards, stays, guys.—Names for ropes. *Halliards* are used for hoisting purposes; *stays* to support masts, &c.; *guys* for working derricks or other moving spars.

Purchase or Tackle.—An arrangement of ropes and pulleys for raising or lowering weights.

Fall.—The rope of a purchase or tackle.

Cleats.—Pieces of wood or metal round which halliards, &c., are secured.

Painter.—A rope fastened to the bows of a boat with which to tow or fasten it.

C. *Naval Words of Command.*

All ranks of the army must also understand the following words of command:—

Ship or unship.—Fix or unfix; put into place or take out of place.

Back starboard.—Reverse the oars on the starboard side and back water.

Back port.—Reverse the oars on the port side and back water.

Lay on your oars, or Oars.—Cease rowing, place the oars in a horizontal position with blades feathered.

Toss your oars.—Lift oars to a perpendicular position and retain them there.

Boat your oars.—Place all oars inside the boat, blades forward.

Belay.—Make fast.

Ease off.—Slacken off.

Handsomely.—Gently, easily.

Stand by.—Be ready.

Walk back.—After hoisting a weight with a purchase, walk towards the weight with the fall of the purchase in hand to keep control over the weight when lowering.

Light to.—Let go the fall of the purchase.

When leaving a ship or pier:—

Shove off.—Push off from the ship's side.

Oars down.—Place oars in the water.

Give way together.—Commence rowing.

When approaching a ship or pier:—

Bows.—Bow oar "boats" his oar and prepares to use his boat-hook.

Way enough.—After the bow oars are laid in, this is the order given to the rowers at which they stop rowing, taking one stroke after the order, and toss and boat their oars; or in a gig or boat fitted with "crutches" (from which oars cannot conveniently be "tossed"), stop rowing and allow their oars to swing free, fore and aft.

D. *Details of Boats.*

Rowing Boats.	Number that form a Tow.	Load.					Draught of Water.	Remarks.
		Men.	Horses.	Guns.	Vehicles. 4-wheeled.	Vehicles. 2-wheeled.		
Lifeboats, 28′ 0″	4	28	Nil	Nil	Nil	Nil	Mean, 1′ 8″ approx.	5 men in addition for working boat.
Launch, 42′ 0″	3	92	Nil	or 2	Nil	or 3	Mean, 2′ 3″ approx.	8 men in addition for working boat.
Pinnace, 36′ 0″	3	65	Nil	or 2	Nil	or 2	Mean, 2′ 0″ approx.	8 men in addition for working boat.
Cutter, 30′ 0″, 1st class cruiser...	4	32	Nil	or 1	Nil	or 1	Mean, 1′ 8″ approx.	6 men in addition for working boat.
Cutter, 34′ 0″, 2nd class cruiser	4	42	Nil	or 1	Nil	or 1	Mean, 1′ 9″ approx.	6 men in addition for working boat.
Horse-boats, 36′ 3″, includes 8″ rubbers	2	110	or 12	or 2 field guns or 3 machine guns or 1 4·7 gun or 42 men with bicycles	or 2	or 4	Loaded, 2′ 0″ Light, 2′ 0″	6 men in addition for working boat.

NOTE.—Men in marching order. Vehicles fully equipped.

E. *Details of Tows.*

Steamboats.	Numbers that form a Tow.							Draught of Water.	Remarks
	Lifeboats.	Launch, 42′ 0″.	Pinnace, 36′ 0″.	Cutters, 1st class cruisers, 30′ 0″.	Cutters, 2nd class cruisers, 24′ 0″ & 30′ 0″.	Horseboats.	Torpedo Rafts.		
56′ 0″ steam pinnace picket boat	4	or 3	or 3	or 4	or 4	or 2	...	Forward, 2′ 8½″ Aft, 4′ 8½″	15 men's weight sink boat 1″.
50′ 0″ steam pinnace ...	4	or 3	or 3	or 4	or 4	or 2	...	Forward, 2′ 6½″ Aft, 4′ 5½″	10 men's weight sink boat 1″.
40′ 0″ steam pinnace ...	4	or { 2 and 1 cutter }	or { 2 and 1 cutter }	or 4	or 4	or { 1 and 1 pinnace or cutter }	...	Forward, 3′ 8″ Aft, 3′ 10½″	8 men's weight sink boat 1″.
28′ 0″ transport steamboat	2	or 1	or { 1 and 1 cutter }	or 2	or 2	or 1	...	Mean, 2′ 0″ approx.	
30′ 0″ steam cutter (service)	2	or 1	or { 1 and 1 cutter 30′ 0″ }	or 3	or	or 1	...	Mean, 2′ 0″ approx.	

18. MAP READING AND FIELD SKETCHING.

1. *Scales.*—Scales on maps are expressed as in the following examples:—

(a) On English Ordnance maps, scale $\frac{1}{63360}$ or 1" to 1 mile.
(b) On foreign maps $\frac{1}{100000}$ or 1 centimetre to 1 kilometre.

The fraction in each case is called the Representative Fraction or R.F., and means that 1 unit on the map (numerator) represents a certain number of the same units on the ground (denominator), thus from (1) above—

1" on the map represents 63,360" on the ground (= 1 mile) from (2) 1" on the map represents 100,000" on the ground; or 1 centimetre on the map represents 100,000 centimetres (= 1 kilometre) on the ground.

To find the number of English miles to the inch for any map that has a R.F., divide the denominator of the R.F. by 63,360; this gives the number of miles to the inch; thus, if R.F. is $\frac{1}{80000}$, then $\frac{80000}{63360}$ = 1·263 miles to the inch.

To find the number of inches to the mile, divide 63,360 by the denominator of the R.F., thus, if R.F. is $\frac{1}{80000}$, then $\frac{63360}{80000}$ = ·792" to the mile.

Scales should usually be from 4" to 6" long (see Plate 9).

Scales generally used for military purposes:—

Camps or billeting areas, defence of villages, etc. ...	4" to a mile and upwards.
Road or river sketch, outpost positions, &c.	1" to 4" to a mile.
General maps or sketch of district	1" to 1" " "

2. *Conventional Signs* enable information to be given on a sketch or map which could not otherwise be conveniently shown. They should be simple in character, and not numerous. It is far better to write descriptions on the face of a sketch or on the outer margin joined to the object by a thin line, in language that cannot be mistaken, than to crowd it with symbols of which the meaning is liable to be misunderstood.

Plate 10 shows the approved conventional signs. Whatever lettering appears on a sketch must be easily legible and should not interfere with the detail.

3. *Map enlarging.*—When it is required to enlarge a map the correct way is to draw squares of any convenient size on the original, and then rule the paper on which the new map is to be made with squares, whose sides bear the required ratio to the sides of the squares on the original.

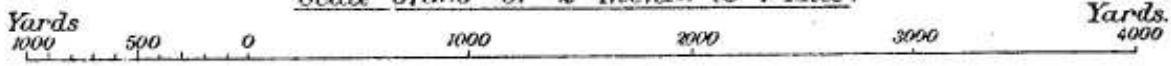
4. *Measurement of slopes.*—Slopes may be uniform, convex or concave, and may be expressed in degrees or as a gradient. Slopes are usually expressed in military terms by a fraction. Thus $\frac{1}{50}$ represents a rise or fall of the unit in 50. An approximate rule for expressing as a fraction a slope given in degrees is to divide the number of degrees by 60. Thus a slope of 3° is equivalent to $\frac{3}{60}$. This rule does not hold for steep slopes. Generally if the slope between two points is convex they are not visible from the other: if the slope is concave they are visible. Slopes are indicated on a sketch by means of "form lines." These are approximate contours sketched in by eye without accurate instruments. The level of a certain number of points is fixed and the shape and slope of the ground is shown by form lines arranged in accordance with these points.

5. *True and Magnetic Bearings.*—To convert from one to the other.

When the Variation is West.

To find true when given magnetic bearing. Subtract the variation; if the result is minus, subtract it from 360°.

Scale $\frac{1}{31680}$ or 2 Inches to 1 Mile.



Scale $\frac{1}{1000000}$ or 1 Inch to 158 Miles

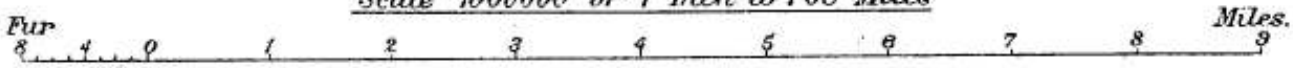


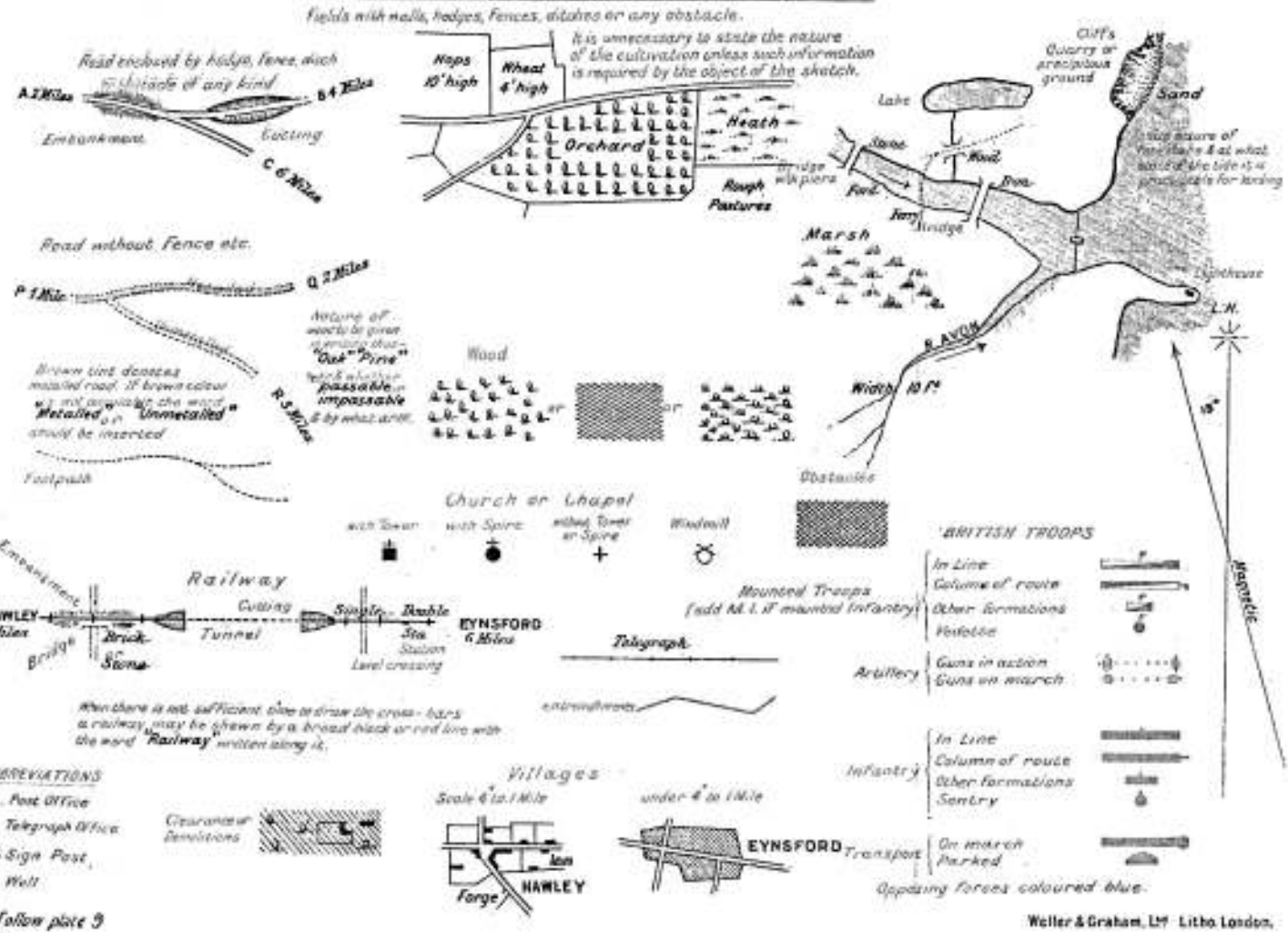
Plate 9.

3339

Walker & Boutall, Ltd. Litho. London

CONVENTIONAL SIGNS & LETTERING USED IN FIELD SKETCHING

Note: Words which should appear on the Sketch are shewn in black.



To follow plate 9

Weller & Graham, Ltd Litho. London.

To find magnetic when given true bearing. Add the variation; if the result is greater than 360°, subtract 360° from it.

When the Variation is East.

To find true when given magnetic bearing. Add the variation; if the result is greater than 360°, subtract 360° from it.

To find magnetic when given true bearing. Subtract the variation; if the result is minus, subtract it from 360°.

The most frequent error arises from forgetting that bearings are always given and measured through east by south, and not the shortest way when this is by west.

6. *Map Reading.*—(a) Look at once for the scale: this is the key to distances.

(b) Note the vertical intervals used, and methods of showing form of ground.

(c) Note the position of ridges, hills and watercourses.

(d) Look for the direction of true or of magnetic north. If no north point is shown assume that its sides are true, north and south. In quoting a bearing, the true bearing should be given.

(e) Note the character of the country, and the effect this might have on operations carried out in it.

7. *Setting a Map.*—A map is said to be "set" when it is laid out to correspond with the ground.

To set the map:—

(a) *With Compass.*—If the magnetic north line is shown on the map, lay the compass over it (produced if necessary) and, without disturbing the compass, turn the map slowly round until the north end of the north point on the map is exactly under the north end of the needle. If the true north line only is shown, and you know the local variation of the compass, plot the magnetic north on the map with a protractor and proceed as before. If you have no protractor, lay the compass on the true north line, and turn the map until this line makes with the needle an angle equal to the variation and on the correct side of it.

(b) *By Objects.*—A map can be set by objects on the ground without using the north point or compass. Identify your position on the ground where you stand as some point marked on the map. Also identify on the map some distant object you can see. Join these two on the map by a straight line. Then turn the map about the point marking your position till this line points to the distant object.

(c) If you have no compass, but the magnetic North is shown on the map, find the approximate true North as described in para. 9, and then turn the map until the magnetic North point points the correct number of degrees West, if the variation is West, East if the variation is East.* If only true North is shown, turn the map until the North point points at the true North you have found.

* You can take degrees roughly by means of a watch, by taking XII. as the 0 of a compass, and remembering that each minute division of the watch corresponds to 6°. Also an extemporary protractor for reading bearings may be made by tearing off the corner of a bit of paper, dividing the right angle in it by folding it over three times, then pencil the creases, which will then show points, *i.e.*, 11¼°.

A map can be set roughly for reading by identifying on the map several prominent objects that can be seen. The map is then held so that the directions between these objects as they appear on the ground and on the map are parallel to one another.

8. *The Service Compass.*—The dial is graduated with two sets of figures which read like the hands of a watch. The inner set is for direct readings without the prism.

The Compass Points to Magnetic North.

The compass gives "bearings" not "angles." The horizontal angles between any distant objects are found by taking the difference of their observed bearings.

To use the compass for night marching it has been constructed so that upon the black direction mark being turned to point to the required "bearing," as shown on the external ring, and the arrow-head being made to correspond with it, the line between the luminous patches in the lid indicates the line of advance.

To prolong the line of advance, a stick painted white or prepared with luminous paint held at an angle of 45° to 60° with the horizontal in the direction indicated by the luminous patches will assist the operator to pick up some object to march on.

If no terrestrial objects are visible an assistant should be employed who notes the alignment of the stick and advances in that direction till halted by means of a low whistle. The operator then notes whether his assistant is on the true line of advance, and moves up on to what he judges the correct alignment, and again sends him forward. After a few advances the assistant should know how far he can go before being lost to sight and halt without waiting for the whistle.

9. *Approximate Methods of Finding the True North.*

(a) With a compass, knowing the magnetic variation which can be obtained approximately from Appendix II.

(b) In the northern hemisphere, in ordinary latitudes, the true bearing of the Pole Star is always within 2° of north.

To find the Pole Star, look for Great Bear, which is like this—

Fig. 1.

The two stars on the right as you look at it in Fig. 1 point to the Pole Star, which is approximately true North. But, as the stars revolve round the Pole, the Great Bear is sometimes in the position shown in Fig. 2

Fig. 2.

In the Southern Hemisphere.—Consider the Southern Cross as a kite; prolong the greater axis 4½ times in the direction of the tail, and the point reached will be approximately the South Pole of the Heavens. If a piece of paper be marked along its edge with twelve dividing lines giving eleven equal divisions, and held so that the first and third dividing lines coincide with the head and tail stars respectively, the intersection of the twelfth dividing line and the edge of the paper will give the approximate south point.

(c) *In the Northern Hemisphere.*—Hold the watch horizontally with the face upward. Point the hour hand at the sun. Then a line from the centre of the dial to a point halfway between the figure XII. and the pointer of the hour hand is approximately a south line.

In the Southern Hemisphere.—Hold the watch as before, but in this case point the line from the centre of the dial to figure XII. at the sun, then the line found as above is in this case approximately a north line.

Note.—This method is a very rough one. It should never be used in the tropics, and the higher the latitude, i.e., the further from the equator, the more reliable it is.

10. *Table of Military Scales and Representative Fractions.*

R.F.		Inches to 1 mile.	Miles to 1 inch.	Where used.
Dover	10,560	6·000	·167	England.
,,	20,000	3·168	·316	Belgium, Denmark, Japan.
,,	25,000	2·534	·395	Germany, Italy, Switzerland, Holland.
,,	31,680	2·000	·500	England.
,,	40,000	1·584	·631	Belgium, Denmark.
,,	50,000	1·267	·789	Holland, Italy, France, Switzerland, and Spain.
,,	62,500	1·013	·988	U.S.A.
,,	63,360	1·000	1·000	England, India.
,,	75,000	·845	1·184	Austria, Italy.
,,	80,000	·792	1·263	France.
,,	100,000	·634	1·578	Germany, Spain, Italy, Norway, France.
,,	125,000	·507	1·97	British African Colonies and Protectorates, and U.S.A.
,,	126,000	·503	1·987	Russia.
,,	126,720	·500	2·000	England.
,,	160,000	·396	2·525	Belgium.
,,	200,000	·317	3·157	France, Germany, Austria.
,,	250,000	·253	3·946	U.S.A., British African Colonies and Protectorates.
,,	253,440	·250	4·000	England, India and Frontier.
,,	320,000	·198	5·011	France, Belgium.
,,	420,000	·151	6·620	Russia.
,,	500,000	·127	7·891	France, Egypt.
,,	1,000,000	·063	15·783	International Map.

CHAPTER IV.

19. FIELD ENGINEERING.

(See also Manual of Field Engineering.)

1. No natural or artificial strength of position will of itself compensate for loss of initiative when an enemy has time and liberty to manœuvre. The choice of a position and its preparation must be made with a view to economizing the power expended on defence in order that the power of offence may be increased.

2. Troops will be divided into two main portions, one for the defence of the position, the other for offensive action.

Artillery posted so as to command the enemy's lines of approach and his probable artillery positions.

Infantry allotted to the defence of the position will be divided into firing line, with supports if required, and local reserves.

3. An extensive position is divided into sections, each of which is assigned to a distinct unit, and has its firing line and local reserves.

Supports close to the firing line, have covered communication with it, and be under cover from shrapnel fire.

4. Local reserves placed where they have facilities for local counter-attack and good cover while waiting for an opportunity; local reserves of flank sections usually echeloned in rear of the flanks, except when the flanks are otherwise secured.

General reserve, which will usually consist of all 3 arms, generally in rear of that portion of the position which, from the general situation and the nature of the ground, offers the best line of advance for the counter-attack. The commander is named in the orders for the occupation of the position and should have a sufficient staff.

5. The following points should be borne in mind when examining a locality which it is desired to strengthen:—

(a) The strong and weak points of the position to be defended should be carefully studied, and the site for entrenchments chosen with due regard to tactical requirements and economy in men.

(b) The enemy in attacking should be continuously exposed to the fire of the defenders. To ensure this, the foreground may require clearing.

(c) The enemy should be deceived as to the strength and dispositions of the defending troops, and the character of their works.

(d) The defenders should be screened from the enemy's view, and sheltered from his fire by natural or artificial cover, so arranged as to permit the maximum development of their own rifle fire.

(e) The free movement of the attacking troops should be hampered by obstacles to detain them under fire and to break their order of attack.

(f) The free movement of the defenders should be facilitated by improving communications within their position, and clearing the way for counter attack.

f. In order that field works may be designed to the best advantage, the effect of rifle and gun fire at various ranges should be fully realized.

II. Rifle Fire.

1. Modern military rifles are sighted to about 2,800 yards. Their maximum range may be taken as about 3,700 yards. The slope of descent of the bullet varies from about $\frac{1}{12}$ at 600 yards and $\frac{1}{20}$ at 1,100 yards to $\frac{1}{35}$ at 2,200 yards.

2. The heights over which an average man can fire on level ground, as adopted in various armies, are:—

	France.	Germany.	Russia.	Great Britain.
Lying down ...	——	11·8in.	—	1ft.
Kneeling ...	3ft. 3·2in.	2ft. 11·4in.	2ft. 10·8in.	3ft.
Standing ...	4ft. 7·1in.	4ft. 7·1in.	4ft. 8·0in.	4ft. 6in.

A higher parapet can be used when firing uphill than downhill.

3. The following table gives the maximum penetration of the pointed bullet in various materials.

In order to obtain proof cover, a percentage must be added to these numbers, e.g., earth parapets should not be less than 3½ feet thick. If the soil is free from stones, a thickness of 4 feet is desirable.

Material.	Maximum penetration.	Remarks.
Steel plate, best hard ...	$\frac{3}{16}$ in.	at 30 yards normal to plate; $\frac{3}{16}$ in. is proof at not less than 600 yards, unless the plate is set at a slope of $\frac{1}{3}$ when $\frac{3}{8}$ in. is proof at 200 yards.
ditto ordinary mild or wrought iron	$\frac{3}{8}$ in.	
Shingle	6 ins.	Not larger than 1-in. ring gauge.
Coal, hard	6 ins.	
Brickwork, cement mortar	9 ins.	150 rounds concentrated on one spot will breach a 9-inch brick wall at 200 yards.
ditto lime mortar ...	14 ins.	
Chalk	15 ins.	
Sand, confined between boards, or in sandbags ...	18 ins.	Very high velocity bullets have less penetration in sand at short than at medium ranges.
Sand, loose	30 ins.	
Hard wood, e.g., oak, with grain	38 ins.	
Earth, free from stones (unrammed)	40 ins.	Ramming earth reduces its resisting power.
Soft wood, e.g., fir, with grain	58 ins.	Penetration of brickwork and timber is less at short than at medium ranges.
Clay	60 ins.	Varies greatly. This is maximum for greasy clay.
Dry turf or peat	80 ins.	

III. Artillery Fire.

1. *Field Guns.*—Both shrapnel shell and high explosive shell are fired by the field artillery of most foreign nations.

Shrapnel with time fuze can be used up to a range of about 6,000 yards. With percussion fuzes shrapnel can be used effectively against troops behind 14 inch brick or 2 feet thick mud walls, as they penetrate before bursting.

High explosive shell are intended for use chiefly against troops under cover or against shielded guns.

The angle of descent of the projectile varies from 1/20 at 1,500 yards to 1/4 at 4,000 yards.

2. *Field Howitzers* fire both shrapnel shell and high explosive shell. The chief difference between their fire and that of field guns is that the shell is heavier (varying from 30 to 46 lbs.), contains a larger bursting charge, and has a steeper angle of descent. Howitzer fire therefore possesses greater searching-power than that of field guns. They can fire shrapnel shell up to a range of about 6,000 yards, while their extreme range is about 7,000 yards. The angle of descent of the projectile may be as steep as 1/1.

The amount of cover necessary to keep out the shell of a howitzer, is described in M.E., Part II, Plate X, Fig. 3. The effect of the burst, though powerful, is very local, and 9 to 12 ins. of earth or 3 to 4 ins. of shingle supported by some suitable material suffices against splinters from the shell.

3. *Heavy Guns and Heavy Howitzers* fire both shrapnel shell and high explosive shell of still greater weight at ranges up to 10,000 yards. These pieces are therefore specially useful for long range enfilading fire.

4. The aim of field artillery in the attack of a position is to assist the advance of its own infantry by bursting its shell in such a position that the defenders will either be forced to keep under cover or be struck. No attempt is made to breach the parapets of the defence.

An occasional shell may strike and penetrate the parapet, but in the case of shrapnel the damage to the parapet will be trifling, while in the case of a shell filled with high explosive, the effect will be no worse on a thin parapet than on a thick one. It is, therefore, useless to spend time and labour on making a thick parapet simply to keep out shell.

IV RANGES.

Terms applied to ranges.	Rifle.	Field Art.	Heavy Batteries.
	Yards.	Yards.	Yards.
Distant	2,800 to 3,000	6,500 to 5,000	10,000 to 6,500
Long	2,000 to 1,400	5,000 to 4,000	6,500 to 5,000
Effective	1,400 to 600	4,000 to 2,500	5,000 to 2,500
Close	600 and under	2,500 and under.	2,500 and under.

The extreme range of field artillery using percussion shell may be taken as 9,000 yards, and of heavy artillery as 10,000 yards.

The width of the area of ground struck by the bullets of an effective shrapnel is about 25 yards.

The length of the forward spread of the bullets of shrapnel burst at medium range is about 200 yards.

The radius of the explosion of a high explosive shell is about 25 yards.

20. SUMMARY OF TOOLS AND EXPLOSIVES CARRIED ON THE PERSON AND IN 1st LINE TRANSPORT.

HOME ESTABLISHMENT.

Tools.	Weight.	Length.	Wagon and Cart Equipment.	Tools.	Wagon and Cart Equipment.	Tools.	Wagon and Cart Equipment.	Tools.	Wagon and Cart Equipment.	Tools.	Tools.	Tools.	Tools.	Wagon and Cart Equipment.	Tools.	Wagon and Cart Equipment.	Tools.
			Cavalry Brigade.		Horse Artillery Brigade.		Field Artillery Brigade, 18-pr.		Field Artillery Howitzer Brigade.		Horse Artillery Battery.	Field Artillery Battery, 18-pr.	Field Artillery Howitzer Battery.		Heavy Artillery Battery.		Heavy Battery Ammunition Column.
(a) Entrenching.	lbs.	ft.	in.														
Shovels, G.S. ...	3	5 (a)	3	1	2	10	62	16	62	144	16	72	56	56	30	4	16	14	8
Spades	3	10	3	2	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Axes, pick ...	5	6	3	0	1	14	31	48	31	73	31	37	18	18	15	2	9	7	4
(b) Cutting.																			
Axes, felling ...	6	7	3	5	1	6	21	12	21	18	12	12	6	6	6	2	...	4	...
Axes, hand ...	2	6	1	4	...	6	...	...	...	...	...	...	...	...	...	...	...	...	...
Hooks, bill ...	1	13	1	31	1	14	21	48	21	12	12	36	18	18	15	2	8	7	4
Hooks, reaping ...	1	6	1	6½	...	3	...	40	...	60	...	14	...	...	...	...	6	...	...
Saws, crosscut ...	6	7	3	0	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Saws, folding ...	1	12½	...	...	...	3	...	...	...	...	...	...	...	...	...	...	...	...	...
Saws, hand, in case ...	5	6	3	2	...	3	...	36	...	54	...	31	12	12	9	...	8	...	...
(x) Wire cutter (in *loops*)	1	4	...	...	...	54	...	62	...	62	...	62	20	20	20	...	20	...	6
(c) Miscellaneous.																			
Crowbars	12	6	2	6	...	3	...	...	...	...	...	...	...	...	...	...	4	...	...
Handbags	...	...	...	...	...	150	...	...	...	...	...	...	...	...	...	...	...	...	...
Mauls, G.S. ...	9	11	...	...	...	3	...	...	...	...	...	...	...	...	...	...	8	...	...
EXPLOSIVES.																			
Gun-cotton, dry primers, field, 1 oz. ...	...		...	...	...	240	...	...	...	...	...	...	...	...	...	...	...	...	...
Gun-cotton, wet, charges, field, 15 oz. ...	...		...	...	...	60	...	...	...	...	...	...	...	...	...	...	...	...	...

SUMMARY OF TOOLS AND EXPLOSIVES CARRIED ON THE PERSON AND IN 1st LINE TRANSPORT—*continued.*
HOME ESTABLISHMENT

Tools.	ENGINEERS. Field Troop. Wagon and Cart Equipment.	ENGINEERS. Field Troop. Tools.	ENGINEERS. Field Company. Wagon and Cart Equipment.	ENGINEERS. Field Company. Tools.	ENGINEERS. Bridging Train. Wagon and Cart Equipment.	ENGINEERS. Bridging Train. Tools.	Infantry Battalion. Wagon and Cart Equipment.	Infantry Battalion. Tools.	Mounted Infantry Battalion. Wagon and Cart Equipment.	Mounted Infantry Battalion. Tools.	M.I. Coy. or Squadron Irish Horse. Wagon and Cart Equipment.	M.I. Coy. or Squadron Irish Horse. Tools.	Headquarters Infantry Brigade. Wagon and Cart Equipment.	Headquarters Infantry Brigade. Tools.
(a) Entrenching.														
(A) Shovels, G.S.	2	37	2	111	10	40	2	224(B)	2	240	...	6	2	120
Spades	...	7	...	19	...	40	...	...	...	...	...	...	...	...
Axes, pick	1	39	1	107(C)	5	40	1	150(D)	1	124	...	4	1	80
(E) Implement (patn. 1908)	...	...	...	...	...	...	...	934	...	...	...	...	...	...
(b) Cutting.														
Axes: felling	1	25	1	47	5	40	1	16	1	6	...	4	1	...
Axes: hand	...	14	...	33	...	...	...	8	...	7	...	3	...	1
Hooks: bill	1	18	1	39	5	40	1	42	1	14	...	4	1	...
Hooks: reaping	...	6	...	10	...	8	...	20	...	4	...	2	...	3
Hooks: crosscut	...	2	...	4	...	...	...	...	...	...	...	...	...	...
Saws: folding	...	4	...	8	...	...	...	32(F)	...	3	...	1	...	...
Saws: hand, in case	...	16	...	27	...	4	...	...	...	3	...	1	...	...
Wirecutters (in frogs)	...	18	...	41	...	41	...	24	...	54	...	18	...	...
(c) Miscellaneous.														
Crowbars	...	6	...	8	...	...	...	8	...	3	...	1	...	9
Sandbags	...	264	...	852	...	...	...	30	...	150	...	50	...	...
Mauls, G.S.	...	3	...	5	...	40	...	...	...	9	...	1	...	...
EXPLOSIVES.														
Gun-cotton: dry, primers, field, 1 oz.	480		...	720	...	...	...	...	...	240	...	89	...	...
Gun-cotton: wet charges field, 15 oz.	240		...	560	...	...	...	...	...	96	...	32	...	...

(a)—The weight and length given are those of G.S. shovel. The R.E. shovel weighs 8lbs. and is 3 feet 4 inches long.

(B)—[illegible] shovels are carried on each company pack animal for tools.

(C)—89, with heads weighing 4½lbs.; 19, with 8lb. heads.

(D)—9 pickaxes are carried on each company pack animal for tools.

(E) 1 hammer-headed axe is carried on each company pack animal for tools.

(F) 1 hammer-headed axe is carried on one of the spare pack animals.

(G) Carried on the person.

INDIA.

Units.	G. S. shovels.	Pick-axes.	Bill-hooks.	Felling axes.	Hand axes.	Hand saws.	Wire cutters.	Spades.	Crowbars.	Gabion knives.	Mamooties.†	Sand bags.	Sickles.	Wire entanglement posts.	Wire, yards.
1 squadron, British cavalry	6	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1 squadron, Ind. (ill. cavalry) ..	20	6	4	1	4	...	18	...	...	...	4	...	...	...	...
1 squadron, Ind. (non-ill.) C.	20	...	4	...	...	...	...	...	...	...	...	...	...	...	...
1 company, British infantry															
1 company, Indian infantry															
1 company, B. M. infantry	20	6	4	1	...	...	18	...	...	...	...	...	...	...	...
1 company, I. M. infantry															
1 Company, Indian pioneers*	18	‡	...	...	...	...	24	...	6	...	...	...	...	...	...
1 Service company of S. & M.	92	75	24	18	30	...	...	...	5	21	2	70	...	...	...
1 Pontoon section	36	36	36	36	...	...	...	...	2	36	36	240	...	...	...
1 Unit, mounted sappers	24	24	...	8	6	...	...	...	5	...	...	9	...	...	...
1 Engineer field park	400	200	24	24	...	...	...	...	32	40	80	2,000	50	2,416	6,182
1 Engineer siege park	1,200	1,250	300	250	54	...	...	75	54	60	1,200	1,500	500	...	...

* In addition to these totals carried on mules, each company of Pioneers normally carries 42 pick-axes, 48 mamooties, 5 felling axes, 10 hand axes, 10 bill-hooks, and 3 hand saws.

† A kind of combined spade and pick-axe.

‡ O. C. to decide.

INDIA—*continued.*

ROYAL ARTILLERY UNITS.

	Axes, pick.	Bars, crow, 4' 6"	Mattocks,* G.S.	Shovels. G.S.	Shovels. H.P.	Bill-hooks.	Felling axes.	Hand saws.	Wire cutters.	Reaping hooks.
H. & F. Batteries in field army	35	6	...	...	36	20	20	12	6	21
Horse Artillery, Ammunition Column	7	1	...	...	16	8	2	6	6	3
Field Artillery, Ammunition Column	21	6	...	...	48	24	6	18	12	9
Field Artillery, Howitzer Batteries	39	6	...	...	30	17	17	9	6	36
Field Artillery, Howitzer Ammunition Column ...	60	3	...	...	60	81	81	27	...	63
Heavy Batteries, Royal Garrison Artillery	24	4	...	...	21	21	16	4	...	16
Mountain Batteries, Royal Garrison Artillery... ...	24	3	12	...	6	12	6	...	...	...
Indian Mountain Batteries ...	24	3	12	6	...	12	6	...	...	...

* A kind of combined spade and pick-axe.

21. TABLE OF TIME, MEN AND TOOLS

REQUIRED FOR THE EXECUTION OF CERTAIN FIELD WORKS.

Except where otherwise stated the material and tools are assumed to be on the site of the work. All tracing and marking out is to be done before the distribution of the working parties at the sites. Not more than five minutes should be consumed in distributing the men, or in changing reliefs, if the men have been told off into suitable groups or parties under leaders previously instructed in the nature of the particular works in hand. One leader or foreman can conveniently supervise up to 20 unskilled men on earthwork.

No.	Nature of Work.	Minutes of one Man.	Per Unit of Task.	Suitable Units Party	Tools per Party.
	ENTRENCHING.				
1	Excavation only ...	3	1 cubic ft.	1	1 shovel and 1 pick
2	Fire trench, 1 rifle ...	100	2 paces or 45 cubic ft.	1	.. ..
3	Fire trench, 1 rifle ...	300	2 paces or 90 cubic ft.	1 or 2	.. ..
4	Fire trench, 1 rifle ...	420	2 paces or 110 cubic ft.	1 or 2	.. ..
5	Communication trench	240	2 paces or 80 cubic ft.	1	.. ..

No.	Remarks and Notes.
1	Average over a relief of 4 hours in ordinary easy soil.
2	Including elbow rest and share of drain. If tools are double manned the time can be reduced to 70 minutes.
3	Earth removed or scattered by other men (*see* items Nos. 6 and 7). If tools are double manned and first pair relieved after 2 hours, time can be reduced to 150 mins.
4	This may also be taken as normal for 1 rifle entrenched as Plate 13, Fig. 2, in a recess 3ft. 6in. wide. If tools are double manned and first pair relieved after 2 hours, time can be reduced to 150 mins.
5	If tools are double manned and first pair relieved after 2 hours, time can be reduced to 135 mins.

Volume excavated in cubic feet: average hourly rates.

Tools used by	1st Hour.	2nd Hour.	3rd Hour.	4th to 8th Hours
One Man:—	30	25	15	10
Tools Double Manned:—	40	33	20	13

6	Shovelling loose earth	1	1 cubic ft.		1	1 shovel	6
7	Removing for yards (average) deposit, and return ...	1 2	1 cubic ft. 1 cubic ft.		1 2	1 barrow 1 stretcher	7
8	Filling sandbags ...	3	1 sandbag		3	2 shovels	8
9	Header, sandbags or sods	60	1 loophole		1	1 shovel	9
10	Overhead cover, added to head cover ...	60	1 rifle		1	1 shovel, 1 hand axe	10
	REVETMENTS.						
11	Brushwood, rough or planks	1½	1 square ft.	revetted	2	1 billhook, 1 mallet	11
12	" as hurdle work ...	2	1 square ft.		2		12
13	Sandling or sack ...	3	1 square ft.		2	—	13
14	Gabions, placing and filling...	5	1 square ft.		1	1 shovel, 1 pick	14
15	Sods, building with...	6	1 square ft.		2	1 shovel or spade	15
16	Sods, providing for 15	9	1 square ft.		3	3 sharp spades	16
17	Gabions, band, making	20	1 gabion		2	—	17
18	Gabions, brushwood, making	340	1 gabion		3	1 billhook, 2 knives 1 mallet, 1 measure	18

6 — As into barrows, boxes, gabions, stretchers, sacks, &c., or cross lifting or spreading carefully. Averaged over 8 hours work.

7 — 2 cubic feet per load. Average weight of earth or sand 1 cwt. per 1 cubic foot. Removing earth over 100 yards is usually more economical by horse and cart, or tram.

8 — Averaged over 2 hours work, *i.e.* 120 bags filled by 3 men. Size up to 30in. × 10in. × 5in. Weight 60 lbs.

9 — For sacks use item No. 6. Corn sacks average 2 bushels = 2½ cubic feet when quite full. Allow 1 cubic foot only.

10 — Up to 12 (sandbags or sods), according to description. For spaces between loopholes calculate by items 13 or 15 below, if necessary.

11 — Allow for 25 square feet of roofing per rifle, in addition to necessary supports. Nails, &c., as obtainable.

12 — Allow 4 lbs. of brushwood and 1 foot of wire per 1 square foot of surface revetted.

13 — Sandbags (already filled) in course of alternate headers and stretchers. 1 sack or 2 bags per 1 sq. ft.

14 — Gabions 2ft. wide by 2ft. 2in. high; area revetted 5½ sq. ft.; contents 8½ cub. ft. Earth to be excavated.

15 — Allow 5 sods each about 18in. by 9in. (say 1 sq. ft. each) by 4in. thick, per 1 square foot of *surface revetted* 18 inches thick. Rate of cutting about 30 sods per hour by one man in 4 hours.

16

17 — Materials: 10 bands and clips, 10 pickets, weight 13 lbs. Filling 25 min. per gabion (*see* No. 14).

18 — Materials: 75 lbs. brushwood, for use and waste; finished weight about 90 lbs.

TABLE OF TIME, MEN AND TOOLS—*continued.*

No.	Nature of work.	Minutes of One Man.	Per Unit of Task.	Suitable Unit Party.	Tools per Party.	No.	Remarks and Notes.
	REVETMENTS—*cont.*						
19	Hurdles, rough, making	60	1 hurdle	3	2 billhooks, 2 knives	19	Materials: 75 lbs. brushwood and 60 ft. of wire or yarn per hurdle. 6ft. by 2ft. 3in. Weight of each complete, about 56 lbs.
20	Hurdles, strong, making	450	1 hurdle	3	1 mallet, 1 pr. pliers	20	
21	Fascines, making ...	240	1 fascine	4	3 billhooks, 2 knives, 1 handsaw, 1 maul, 1 pr. pliers, 1 choker.	21	Materials: 200 lbs. brushwood and 60 ft. of wire or hoop iron (40ft.) per fascine, 15ft. long by 9in. diameter. Weight complete about 140 lbs. Cradle for making requires 10 pickets, 6ft. 6in. by 3in. diameter.
	CUTTING AND FELLING.						
22	Trees, felling... ...	1	1in. of diamr.	1	1 felling axe, or saw	22	Over 12 inches diameter allow time in minutes $= \frac{d^3}{144}$, where d = mean diameter in inches. If only hand axes are available allow twice the time as calculated by both these rules.
23	Woods, clearing of brushwood and small trees	2½	1 square yd.	20	10 billhooks, 4 felling axes, 4 hand axes, 2 saws, 1 grindstone, 2 whetstones	23	All hands felling at first: then a proportion detailed for collecting and and removing according to purpose in view. Produce: about 5 lbs. brushwood per 1 square yd.
24	Hedges, felling stems	10	1 yard run	3	1 billhook or hand-axe, 1 saw 3 fathoms rope	24	Average stiff thorn up to 2in. diameter. If necessary use rope to expose lower stems to the cutting tool.
25	Brick wall, notches in	10	1 notch	1	1 pick or crowbar	25	If possible obtain a mason's chisel and hammer.
26	Brick walls, loopholes in	30	1 loophole	1		26	Walls up to 18in. thick.

OBSTACLES.						
27. Abatis, and wired ...	120	1 yard run	20	as for item 23; also 3 mauls, 3 pr. pliers 1 pickaxe, 1 shovel	27	1 trong row. The material must be close at hand. Allow 20 yards wire per run yard, per row. The length of the branches is more important than their size. Wire each butt securely to a separate stout picket driven at least 2 feet into the ground. Wire for density near the ground.
28. Wire entanglement	30	1 square yd.	3	1 billhook, 1 hand-saw 1 maul, 1 pr. pliers 1 pr. wire cutters 3 rag pads for gripping and straining wire. *In hard ground add:* 1 steel jumper 1 sledge hammer	28	Materials: 1 stout post 5 to 9 feet long by 5 to 6in. diam. per 4 square yards of obstacle. 1 stout picket 2 to 3 feet long by 5in diam. per yard run of finished obstacle, for side stays. 12 to 18 yards of wire per 1 square yard of finished obstacle.

N.B.—A very formidable obstacle can be made with three stout posts, 1 stout picket and 150 yards wire per yard run complete. Barbed wire is most quickly handled and fixed if issued in lengths of about 10 feet, when issued in entanglements. This does not apply to straight fencing such as shown in Pl. 22, Fig. 3.

22. DEFENCE OF LOCALITIES, ETC.

1. IN PRACTICALLY ALL POSITIONS THERE WILL BE LOCALITIES OF SPECIAL TACTICAL IMPORTANCE. IT IS ON LOCALITIES OF THIS NATURE THAT THE PRINCIPAL EFFORTS OF THE DEFENDER SHOULD BE CONCENTRATED. They may be commanding features of the ground, groups of substantial buildings and enclosures, or wooded knolls giving cover from view and a good field of fire to front and flanks.

2. Each locality should be capable of all-round defence, and each should be able to sweep with fire a large proportion of the ground lying between it and those on either side.

The number of troops necessary for the defence of the intervening ground need not then be large, and the defence works themselves may be limited to ensuring that ground invisible to the defenders of the pivot groups is swept by fire.

3. The principal defences will, as a rule, consist of fire trenches, hedges and walls.

4. *Fire Trenches* may be disposed in irregular lines or in groups with intervals, according to the character of the ground.

In selecting the sites for fire trenches, the following points require attention:—

(a) Good field of fire. Most important within 400 yards of the trench. Range marks, if possible, to be added.
(b) Concealment and Invisibility. Obtained by adapting trenches to form of the ground, keeping parapets low, and by use of natural or artificial cover.
(c) Parapet should be bullet-proof.
(d) Head cover should be provided, if possible, but must be inconspicuous.
(e) Trenches should be traversed or recessed if enfilade fire is likely.
(f) Cover for supports near at hand.
(g) Trenches should have steep interior slope, be wide enough to allow men to pass, and drainage should be provided. (For types see Plates 11 and 12.)

5. *Walls* can be notched or loopholed. The latter give the best cover, but should not be closer than 3 feet from centre to centre. Dummy loopholes should be added. If firing over the tops of walls is to be employed, they should be covered with sods, turf, etc.

6. *Hedges* may be used as screens, or revetments to support the earth of a parapet. They must be thick enough to prevent the earth showing through. Work should be concentrated at first only at the points to be occupied by each man.

7. *Overhead Cover* to keep out splinters of shell, etc., should consist of 9 to 12 inches of earth or 3 inches of shingle supported on brushwood, boards, corrugated iron, etc.

8. *Protected Look-outs* will be needed for commanders, etc. A type is shown on Plate 11. This is also suitable for a sentry group in the outpost line.

9. *Roads* of a temporary nature are usually required:—

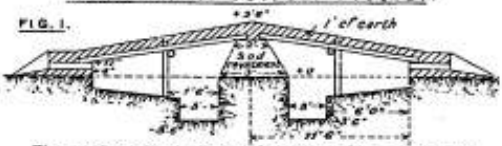
(a) In connection with a defensive position to enable troops or guns to be readily moved from one portion to another.
(b) For movement across country devoid of suitable tracks.

Within a position, troops and messengers should be guided to their destination by signposts, by "blazing" trees or other means.

10. A roadway 10 feet wide (8 feet minimum) will take a

Cover for an Outpost Picquet.

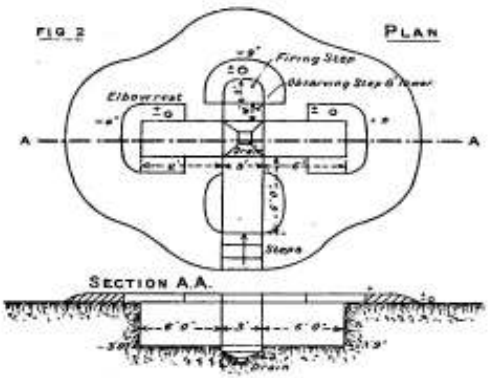
FIG. 1.



The work is circular in plan. An entrance 3 feet wide is left on the least exposed face. Drainage should be made on the lowest side. The work is covered with sods. The overhead cover may be supported in different ways according to material available

Cover for a Sentry Group.

FIG. 2



Hadley & Sons Lith.

To face page 34.

FIRE TRENCHES

FIG. 1.

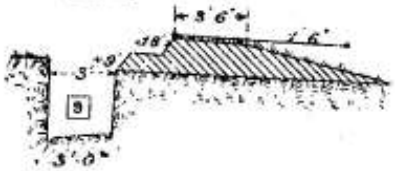
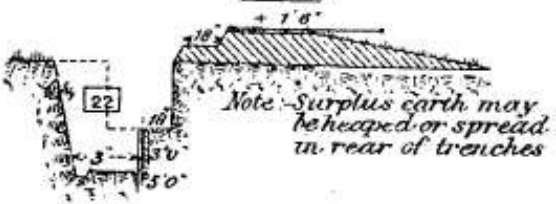


FIG. 2.

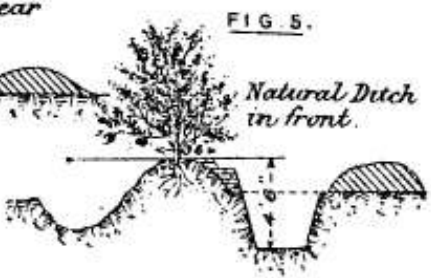
FIG. 3.



HEDGES

FIG. 4.

FIG. 5.



COMMUNICATION TRENCH.

FIG. 5.

45. 23187/452 80000. 12. 11

To follow Plate II.

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single line of wagons* passing in one direction, or infantry in fours; 12 feet is better for allowing horsemen to pass without difficulty; for each additional line of vehicles 8 feet should be added to the width of the road. A width of 6 feet is sufficient for infantry in file or pack animals moving in one direction.

Gaps in walls, hedges, etc., forming road boundaries, should be made at least 15 feet wide if intended for wheeled traffic.

11. The gradient for a short distance, such as a ramp leading on to a bridge, may be $\frac{1}{4}$ or even $\frac{1}{3}$ for infantry, and $\frac{1}{7}$ for artillery, provided it is straight, but for animals or wheeled traffic slopes steeper than $\frac{1}{10}$ are inconvenient, and if an incline is a long one its slope should be at least $\frac{1}{20}$.

12. When a road has to be constructed, the centre line should be marked by pickets, or the margins by *spitlocking*, and some kind of pathway cleared. The more difficult portions must be dealt with first, and the whole road rendered passable by artillery before any portion is still further improved.

13. When ascending a hill by means of zig-zags the road should be made as level as possible at each angle, and half as wide again as in the straight portions. The road should be prolonged up-hill about 12 yards beyond each turn to enable teams to pull straight until the vehicle reaches the level turn. Short zig-zags should be avoided, and no curves should be sharper than with a radius of 60 feet for traffic of all arms to meet and pass without producing a deadlock.

14. The best foundation for a temporary road over boggy ground is one or more layers of fascines or hurdles; the top row must lie across the direction of the traffic touching one another. When time is short or suitable material is not at hand, much can be done by throwing down brushwood, heather, or even straw or grass laid across the road. It is quite useless to place stones or earth in small quantities upon a yielding foundation.

15. Where timber is available and heavy traffic is expected, a "corduroy" road may be made by felling trees, and laying them across the road at right angles to its direction, ribands being spiked to them at either end or the logs may be held together by interlacing with rope or wire.

The interstices between fascines, brushwood, logs, etc., may be filled with small stones and earth to make a better surface.

ii. *Use of Villages in Defence.*

1. For the defence of a village, a definite garrison should be detailed under the command of a selected officer. The latter will be responsible for selecting the main and any interior lines of defence, for dividing the village into sub-sections, for allotting to each a proportion of the garrison, for arranging for a central hospital for wounded men, and for notifying the position of his headquarters. A general reserve should be retained to deliver local counter attacks.

2. Each subordinate commander should consider the preparations for the defence of his sub-section in the following order:—

(a) Improvement of the field of fire.
(b) Provision of cover, much of which may be done concurrently with (1).

* The width over all service vehicles varies from 6 feet (Telegraph Cable Cart, Mk. II) to 7 feet (Ambulance Wagon, Mk. VI), and 2 wheel tracks, each 1 foot wide, spaced at 5 feet apart between inside edges, will accommodate all service vehicles.

(c) Provision and improvement of communications.
(d) Provision of obstacles and barricades.
(e) Arrangements for extinguishing fires.
(f) Ammunition supply.
(g) Food and water.
(h) Removal of sick and wounded.
(j) Retrenchment.

3. The firing line should at first be placed in front of any buildings to prevent casualties from shells which burst against their walls.

iii. *Use of Buildings in Defence.*

1. The following points require attention:—
   (a) Bullet-proof barricades to doors and windows. The means of exit, not necessarily on the ground floor, must be dealt with in a special way. It is easier to make loop-holes in the barricades rather than to attempt to loophole the walls.
   (b) Arrangements for ventilation, for the storage of ammunition, provisions and water, for a hospital and for latrines.
   (c) Arrangements for extinguishing fires.
   (d) Destruction of any outlying buildings which are not to be occupied, bearing in mind the importance of leaving no adjacent cover where an enemy might collect for assault.

2. If the building is large and strongly built, and it is intended to make an obstinate defence, arrangements must be made for interior defence by loopholing partition walls and upper floors made bullet-proof and strengthened if necessary to sustain the extra weight. Material with which to improvise additional cover or movable barricades to cover the retreat from one part of the building to the other, or from one building to another, must also be provided.

iv. *Use of Woods in Defence.*

1. The two attributes common to most woods are the obstruction they offer to the passage of troops, and the concealment they provide.

2. Special precautions are necessary for the defence of woods which run down from a position towards the enemy, since they make co-operation between the artillery and infantry of the defence almost impossible and afford the enemy a covered line of approach.

3. In the case of most woods the improvement of communications is one of the first considerations.

4. The front edge of a wood often has a boundary capable of being quickly made into a good fire position, but usually offers a good mark for artillery fire; for this reason it may be desirable to place the firing line some 200 yards in advance, this being about the maximum distance short of the wood at which shrapnel should be burst, in order to be effective.

If by clearing the undergrowth a good field of fire can be obtained between the tree trunks, the firing line may sometimes be placed with advantage 25 to 50 yards within the wood.

5. Where roads, rides or clearings exist in a wood the rear edge may be organized as a second line of defence.

6. If defences in rear of a wood are more convenient than in front, the best arrangement will be to straighten and entangle

the flanks and rear edge and take up an enfilading position some distance behind. Communications throughout the wood should be blocked.

v. *Defence of Posts.*

1. The following are points to remember:—

(a) Organization of inner and outer defences.
(b) Defenders should be quartered close to the positions they have to man.
(c) Arrangements for storage of ammunition water and supplies.
(d) Provision of strong obstacles.
(e) Adequate cover with a clear field of fire.
(f) Provision of automatic alarms, if possible.
(g) Good communications, including telephones, telegraphs, and signalling.

vi. *Field Redoubts.*

1. Field redoubts are works entirely enclosed by defensible parapets which give all round rifle fire, and may be of any command.

2. UNDER ORDINARY CONDITIONS REDOUBTS IN DEFENSIVE POSITIONS MUST NOT BE DESIGNED OR SITED IN SUCH A WAY THAT THEY CAN BE RECOGNIZED AS SUCH BY THE ENEMY. This will prevent their employment in the main zone of defence as a general rule.

3. Their principal use will be on the lines of communication, for isolated posts and sometimes as supporting points in rear of a defended position.

4. Rules for trenches apply to redoubts, but the following additional points are important:—

(a) Plan or trace of a redoubt depends on: (a) Fire effect required from it; (b) Configuration of the ground; (c) Proposed garrison.
(b) If possible interior not to be seen from ground which may be occupied by enemy. If the inside is exposed the garrison must burrow.
(c) Good splinter-proof cover.
(d) Good obstacles.
(e) No dead angles.
(f) Faces long enough to give an effective fire.
(g) Proportion of all defenders to size of work from 1 to 1½ men per yard of parapet.
(h) Overhead cover.
(j) Latrines and cooking places.
(k) Provide for water supply.

23. OBSTACLES.

1. OBSTACLES ARE USED TO OBTAIN A DEFINITE CONTROL, BOTH AS REGARDS DIRECTION AND SPEED, OVER THE PROGRESS OF TROOPS ADVANCING TO THE ATTACK. THEIR CHIEF VALUE LIES IN THEIR POWER TO DEFLECT THE ATTACKING TROOPS INTO AREAS MOST FAVOURABLE FOR THEIR DESTRUCTION BY THE DEFENDERS. With this object in view they should be arranged (a) to break up the unity of action and cohesion of the attacking troops, (b) to deflect the parties thus isolated into the best swept fields of fire, and (c) to arrest them under the close fire of the defenders. They are especially useful against night attacks.

2. They should fulfil the following conditions:—

(a) They should be under the close rifle of the defender, the outer edge not more than about 100 yards from the parapet. For small posts or redoubts they should be *quite close*, so that they may be effectively defended at night; but, if they are much less than the distance given above, it will be possible to throw hand grenades into the work. They should be as wide as time and material will allow, should afford the enemy no cover, and should be sheltered from his artillery fire. Their actual position will generally be determined by placing them where they can be covered by the most effective fire of the defenders.

(b) They should be difficult to remove or surmount, and will be most effective if special appliances, not usually carried by troops, are required for their removal. Special attention should be paid to the security of their anchorages.

(c) They should, if possible, be so placed that their exact position and nature are unknown to the attacking force; with this object their sites may be sunk. Conspicuously placed obstacles may betray the existence of an otherwise well concealed position.

(d) They should be arranged so as not to impede counter attacks.

(e) They should not be constructed without authority from the commander of the section of the defence.

(f) They need not be continuous, but may be constructed in sections. Occasional gaps in the line will often lead the attackers to crowd in towards them. Such passages may be provided with land mines, and must be covered by gun and rifle fire. Roads passing through obstacles, and occasionally required for use by the defence, should be closed by portable obstacles, such as chevaux de frise, when not required for traffic.

3. The greatest length of obstacle which can be controlled by one man on a stormy and dark night is about 35 yards on either side. Where the total length of obstacle exceeds 70 yards, additional sentries, systematic patrolling, or efficient mechanical alarm signals will be necessary.

24. WORKING PARTIES AND THEIR TASKS.

1. With full-sized tools the average soldier should excavate in ordinary soil the following volumes in each hour:—

1st hour	... ...	30 cubic feet
2nd "	... ...	25 " "
3rd "	... ...	15 " "
4th "	and after, up to 8 hours ...	10 " "

or 80 cubic feet in a four hour relief.

If the soil is very easy these rates may be increased, and *vice versâ*; and if two men are detailed to each set of tools these rates may be multiplied by $\frac{3}{2}$.

These rates hold good for a maximum horizonal throw of 12 feet, combined with a lift out of a trench 4 feet deep.

2. The proportion of picks to shovels will be decided according to the nature of the soil. In ordinary soil the entrenching implement is almost equal to a pick. In moderately hard ground a good proportion of tools (excluding the entrenching

implements) is 110 shovels, 55 picks with 60 helves, and 10 crowbars per 100 men, working continuous reliefs up to a total of 40 hours. This proportion gives sufficient spare to enable defective tools to be rejected.

3. IN THE CASE OF FIRE TRENCHES ALL QUESTIONS OF MECHANICAL SPACING AND DISTRIBUTION MUST GIVE WAY TO THE SELECTION, ON THE GROUND, OF THE BEST FIRING POINT FOR EACH AVAILABLE RIFLE.

4. For continuous trenchwork the normal distance apart at which men are spaced for work is two paces (5 feet).

5. The following form may be useful to facilitate *rapid commencement of work* and to ensure that *men and tools are employed in the most advantageous manner.*

The commander of the unit concerned (in this example a battalion) details his men and tools to the works in their respective order of importance, as shown in Cols. 1, 2, 3, 4 and 5. Should the tools with the unit not be sufficient, the commander would then apply to his superior for the remainder.

The latter would then fill in Column 6, showing whence the balance of tools required was to be obtained.

ii. EXAMPLE OF WORKING PARTY TABLE.

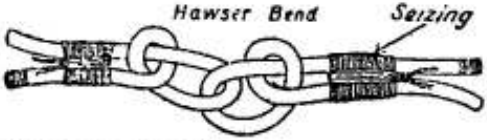
WATLING RIDGE POSITION, NO. 2 SECTION (13TH INFANTRY BRIGADE), 1ST SCOTS FUSILIERS.

1	2		3	4	5	6
Task. (1" Map Sheet 364).	Men. No	Men. From	Tools required.	Tools with unit.	Balance to complete.	Remarks.
1. East of HEXHAM COPSE at foot of slope (near rusty plough). Two 40-Rifle trenches, 18" command, traversed, recessed and with head cover. Soil easy. Will probably take 7 hours.	80	C Co.	40 picks 80 shovels	40 80	— —	
2. HEXHAM COPSE. Clear. Brushwood and small trees. About 6,000 sq. yards. Some brushwood required for trench above.	40	A Co.	10 felling axes 70 billhooks or handaxes	10 49	— 21	*1st Dublin Fusiliers*
3. West of NORTHAM FARM at foot of slope (cleft stick and paper). Two 30-Rifle trenches, 12" command. Soil very difficult. Probably take 8 hours.	60	B Co.	60 picks 60 shovels	60 60	— —	
4. Communication trench from above trenches to rear of NORTHAM FARM. 200 yards. Soil difficult.	120	D & E Cos.	120 picks 120 shovels	51 86	69 34	*use grubbers, none available. 20 only Brig. Res.*
&c. &c.						

25 KNOTS, CORDAGE, BLOCKS AND TACKLES.

Knots.

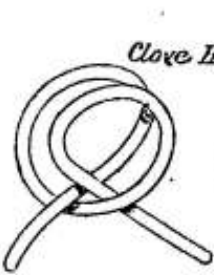
1. To make a stop on a rope, or to prevent the end from unfraying, or to prevent its slipping through a block; the *thumb knot* or the *figure of 8*.

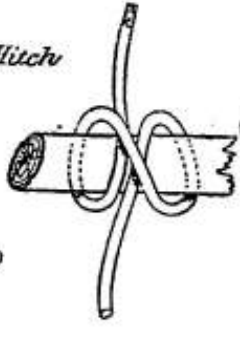


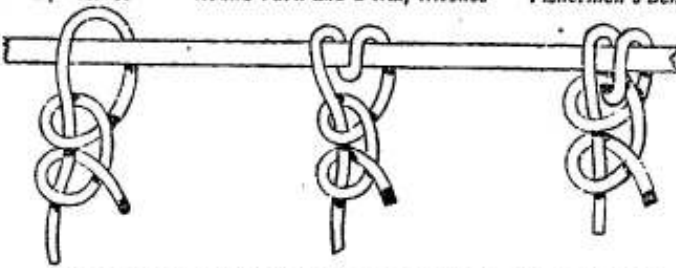
2. To join two ropes together—

Same size (dry)	Reef.
Different sizes (dry)	Single Sheet Bend.
" " (wet ropes) ...	Double Sheet Bend.
" " or large cables	Hawser Bend.

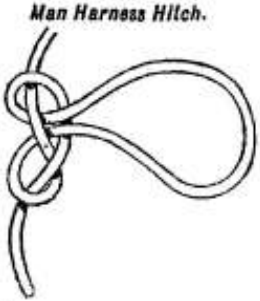
3. To form a loop or *bight* on a rope which will not slip. The *bowline* for a loop at the end of a rope, the *bowline on a bight* for a loop in the middle, with a double of the rope.



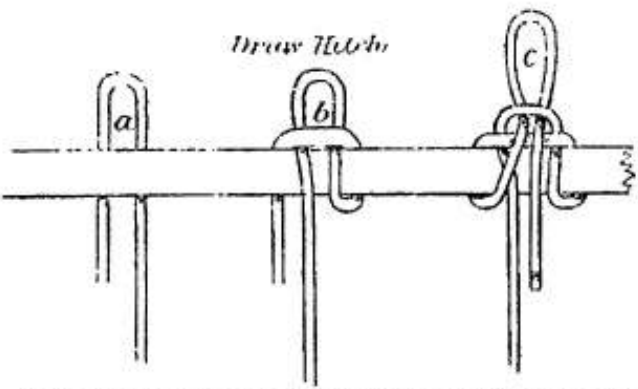




4. To secure the ends of ropes to spars or to other ropes.—2 Half Hitches, Clove Hitch, Timber Hitch, Round Turn and 2 Half Hitches.



5. To fix a spar across a rope—Lever Hitch.
6. To form a loop on a drag-rope—Man's Harness Hitch.



7. To secure a headrope, boats' painter, etc., to a post ring or rope, so that it can be quickly released—Draw Hitch.

8. To transfer the strain on one rope to another—Stopper Hitch.

Cat's Paw on Centre of Rope.

9. To fix a rope with a weight on it rapidly to a block—Cat's Paw, or Blackwall Hitch.

ii. *Cordage, Etc.*

1. The size of a rope is denoted by its circumference in inches, and its length is given in fathoms. (A fathom is 6 feet.)

2. For field purposes, the safe working load for all cordage has been laid down as C^2 cwts., while for steel wire rope it may be taken as $9\ C^2$ cwts., where C is the circumference in inches. Steel wire rope may be taken as twice as strong as iron wire rope.

3. The strength of wire varies greatly; as a very rough rule it may be taken that the breaking weight in pounds equals three times the weight per mile in pounds. Steel wire may be taken as about twice as strong.

4. The strength of a lashing round two objects may be taken as $\frac{1}{8}$ of the number of times the lashing passes from one object to the other multiplied by the unit strength of the lashing, *e.g.*, a square lashing with four turns has a holding power of $\frac{1}{8} \times 16 \times$ strength of lashing; in the case of a hook lashed to a spar with four turns it is $\frac{1}{8} \times 8 \times$ strength of lashing.

When using wire in lashings, multiply by $\frac{3}{8}$ instead of $\frac{1}{8}$.

iii. *Blocks and Tackles.*

1. Blocks are used for the purpose of changing the direction of ropes or of gaining power.

They are called single, double, treble, etc., according to the number of sheaves which they contain. The sheaves revolve on a pin, which should be kept well lubricated.

2. *Snatch blocks* are single blocks with an opening in one side of the shell, to admit a rope without passing its end through. This opening is closed by a hinged strap.

3. The rope with which tackles are *rove* is called a *fall*. To *overhaul* is to separate the blocks. To *round in* is to bring them closer together. When brought together the blocks are said to be *chock*.

In using tackle care must be taken to prevent it twisting.

4. In any system of two blocks, if P be the power required to raise a weight W, G the number of returns at the movable block, and N the total number of sheaves; then

$$P = \frac{W}{G} + \left(\frac{N}{10} \times \frac{W}{G}\right)$$

26. BRIDGES AND BRIDGING EXPEDIENTS.

1. Tactical requirements will determine the locality for a military bridge, but the nature of the banks and approaches, the nature of the bed, width to be bridged, depth of water, strength of current, and the probability and extent of floods, are important from a technical point of view. If a tidal river, the rise and fall of the tide should be ascertained.

2. THE APPROACHES AT BOTH ENDS OF A BRIDGE ARE A MATTER OF GREAT IMPORTANCE. EASY ACCESS AND A DIFFICULT EXIT ARE LIABLE TO CAUSE CROWDING AT THE ENTRANCE TO, AND ON, A BRIDGE, WHICH MAY LEAD TO ACCIDENTS AND DELAY.

ii. *Bridging Expedients.*

1. For tactical reasons it is often important to pass men, horses and artillery, across water at the earliest possible moment, and some expedient must precede work of a more deliberate nature.

2. A few of these bridging expedients are given below:—

(a) In shallow water, carts or wagons may be used to form the substructure for a bridge.

(b) Small gaps may be filled up with bundles of brushwood, channels being left for the passage of the water.

(c) Rafts or even piers for bridges may be made of waterproof material such as tarpaulins, ground-sheets, etc., stuffed with hay, straw, heather, ferns, etc.

A raft consisting of four 18 foot by 15 foot tarpaulins stuffed with hay will carry a load not exceeding 24 cwt. The best method of filling each tarpaulin is to make a light framework of poles, 6 feet square by 2 feet 6 inches high, on the ground (a hole of similar dimensions will do almost as well). Then place two lashings about 24 feet long across the framework each way, and over these the tarpaulin, well-soaked. Fill the tarpaulin with hay and trample it well down. The ends and sides of the tarpaulin are then folded over the hay, and the whole made into a compact bundle by securing the lashings across the top. (*See* Plate 13.)

The stores required are:—

Tarpaulins	4
Hay, etc. (tons)	1½
Planks	16
Spars (average 4" diam.), four 16', four 14' and two 12'	10
Lashings, 1" about 3 fms. long	40
" 1½", about 6 fms. long	16
Ropes, 2", length according to width of river ...	2
Punting poles	2

Smaller rafts can similarly be made by stuffing ground-sheets with hay or straw. 24 of these made into a raft will support a load of 1,800 lbs. It is essential for the sake of stability, that, unless the buoyancy is much in excess of that actually required, the length of each pier of a raft should be twice the width of the platform of the raft. IF THE RAFT IS FORMED OF ONE PIER ONLY THE PART OF THE PLATFORM LOADED SHOULD ONLY BE THE CENTRAL QUARTER.

(d) A rough boat can be made by covering the body of the Mark IX G.S. wagon with its tarpaulin cover. Any projecting points of the wagon must be covered with hay to protect the tarpaulin, and any holes in the wagon should be filled in the

RAFTS AND BRIDGES

FIG. 1. TARPAULIN RAFT.

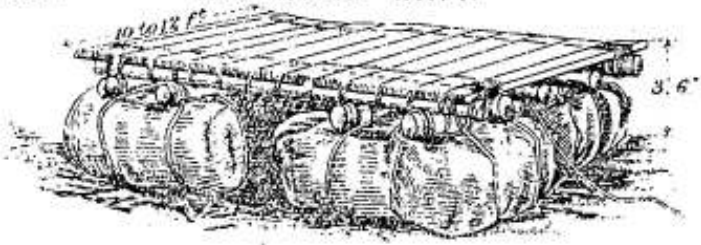
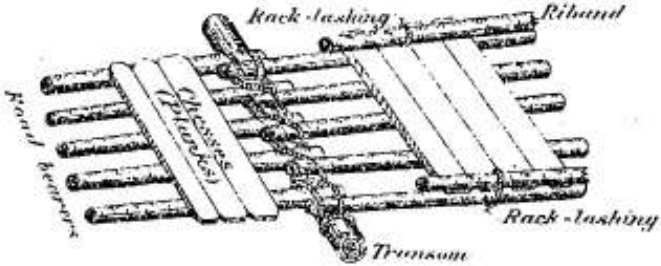
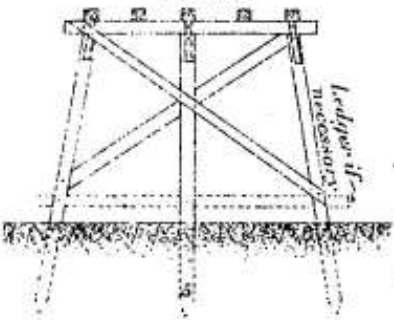


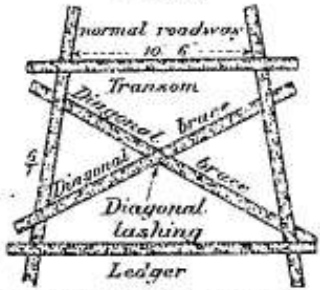
FIG. 2. ROADWAY



LASHED SPAR TRESTLE
FIG. 4.

FIG. 3.





All Junctions lashed with wire or rope, square lashings except where stated.

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FIG. 1. LAUNCHING TRESTLES.

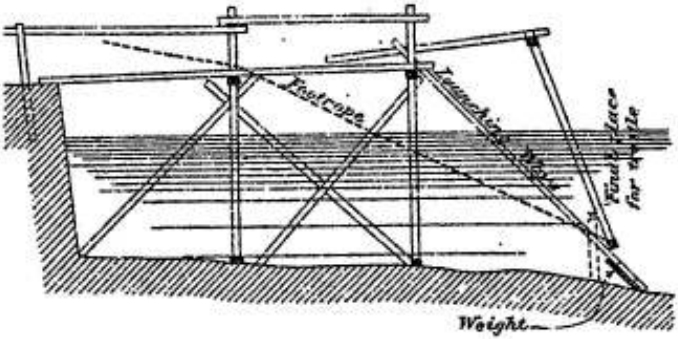


FIG. 2. CANTILEVER BRIDGE.

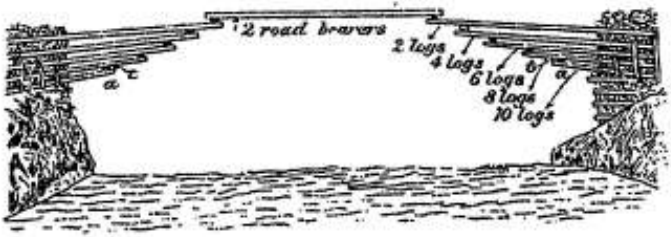


FIG. 3.
CRIB PIER IN SHALLOW WATER.

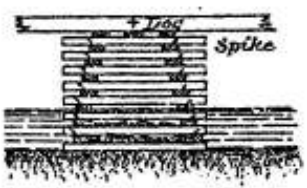
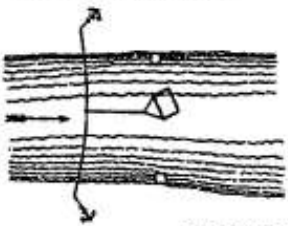


FIG. 4.
FLYING BRIDGE.



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To follow Plate 13

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same way. The tarpaulin must be kept close to the wagon body by lashings. If sufficient lashings are available, one should be tied right round the wagon two-thirds of the way back from the front, while a second should be lashed round the wagon half way up its side, passing through the eyelet holes in the cover. 4 to 6 men may be carried sitting down in this boat.

Rough boats may be made in a similar way by fastening tarpaulins over a brushwood framework.

iii. *Bridges.*

1. Where better facilities for the passage of water or ravines are required, some form of bridge will be needed.

2. The type of bridge will vary according to the materials available, the traffic expected and the nature, breadth, depth, etc., of the span to be bridged; but WHATEVER ARM OF THE SERVICE A BRIDGE IS CONSTRUCTED TO CARRY, IT SHOULD BE CAPABLE OF CARRYING THAT ARM WHEN CROWDED.

3. The most usual forms of bridges are trestle, cantilever and floating. Other methods sometimes employed are suspension, frame and crib work.

4. A bridge that will carry infantry in fours crowded will carry field guns and 5-inch howitzers and most of the ordinary wagons that accompany an army in the field.

To prevent it being improperly used a signboard should be placed at each end, stating the greatest permissible load, thus:—

"Bridge to carry infantry in fours."
"Bridge to carry infantry in file."
"Bridge to carry guns not heavier than 18-pr."
"Not for animals," etc.

5. The usual form of roadway is shown on Plate 13. The normal width of roadway is 9 feet between the ribands; 8 feet will suffice for infantry in fours or cavalry in half sections; 6 feet for infantry in file, cavalry in single file and field guns passed over by hand; 1½ to 3 feet for infantry in single file. Types of trestles and bridges are shown on Plates 13 and 14. Planks 1½ to 2 in. thick are sufficient for ordinary traffic. Handrails 3 feet above the roadway should be provided.

27. BRIDGING MATERIAL CARRIED IN THE FIELD.

1. A field troop carries 2 collapsible boats, each 18' 6" long, making one raft. A field company carries 2 pontoons and 2 trestles, with superstructure, capable of constructing 75 feet of medium bridge.

2. A bridging train carries 32 pontoons and 32 bays of superstructure, capable of constructing 160 yards of medium bridge; also 16 trestles and 8 bays of superstructure, capable of constructing 40 yards of medium bridge.

3. The following times are given as a guide in average conditions and with trained men. It is not, as a rule, the actual placing of the pontoons which takes the time, but the preparation of the approaches, and the distance pontoons and superstructure have to be carried.

(a) Field company placing its pontoons and completing roadway. No allowance made for making ramps. Site without unusual difficulties. Includes unpacking pontoons—½ hour.

(b) As above, including the 2 trestles (this includes unpacking trestles and putting them together)—About 2 hours.

(c) 50 *yards bridge.*—

Ample labour assumed, sufficient for one party to make bridge and another to unload wagons. One trestle assumed at each end of bridge—2½—3 hours.
If no trestles were required the time could probably be reduced to—From 1 hour to 1½ hours.

100 *yards bridge.*—

Ample labour: one trestle at each end—3½ to 4 hours.
If no trestles were required—2½ to 2½ hours.

200 *yards bridge.*—

Ample labour as before. All material of bridging train required so 7 or 8 trestles will have to be put in. Time to make whole bridge will practically depend on the time taken to place the trestles—8 to 10 hours.

4. Night work will add from 50 to 100 per cent. to the above times.

28. WEIGHTS OF TROOPS, GUNS AND MATERIALS.

1. The maximum weights brought on a bridge by the passage of troops in marching order are:—

Infantry, in file, crowded at a check,			2½ cwts.	per lineal foot of the bridge irrespective of width of roadway, provided the formation is preserved.
,, in fours	,,	,,	5 ,,	
Cavalry, in single file	,,	,,	1½ ,,	
,, in half-sections	,,	,,	3½ ,,	

Armed men in a disorganized mass may weigh 1½ cwt. per square foot of standing room.

2. The maximum weights brought on a bridge by guns of an army in the field are:—

13-pr. Q.F. gun,	maximum	concentrated weight on one bay,	13 cwt.
18-pr. Q.F. gun	do.	do.	24 ,,
4·5-in. Howitzer	do.	do.	26 ,,
60-pr. B.L. gun	do.	do.	67 ,,

3. The weights brought on a bridge by certain animals are:—

Camels, loaded	15 cwt.
,, ,, weight on one leg	10 ,,
Pack-bullocks	5½ ,,
,, weight on one leg	3½ ,,
Elephants, loaded, weight on one leg ...	44 ,,

4. The weight of earth 1 inch thick may be taken as 10 lbs. per square foot covered; and of soft timber 40 lbs. per cubic foot.

B. Formulæ for Calculating Size for Roadbearers, Transoms and Cantilevers.

1. Rough formulæ for calculating the sizes necessary for road bearers and transoms, etc., are given below. The formulæ include a factor of 1½ for live load, in addition to a factor of

safety of 3; they also allow for a normal weight of superstructure.

For unselected rectangular beams supported at both ends:—

$$W = \frac{bd^2}{L} \times K \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad (A)$$

For unselected round spars supported at both ends:—

$$W = \frac{8}{10} \times \frac{d^3}{L} \times K \quad . \quad . \quad . \quad . \quad . \quad (B)$$

2. The formulæ for strength of cantilevers are as follows:—

For unselected rectangular beams fixed at one end:—

$$W = \frac{1}{3} F \times \frac{bd^2}{L} \times K \quad . \quad . \quad . \quad . \quad . \quad . \quad (C)$$

For unselected round spars fixed at one end:—

$$W = \frac{1}{3} \times \frac{8}{10} \times \frac{d^3}{L} \times K. \quad . \quad . \quad . \quad (D)$$

3. In the above formulæ,

W = actual load on one beam in cwts. evenly distributed (without superstructure).

b = breadth of beam in inches.

d = depth of beam in inches.

L = { length of beam in feet between points of support for (A) and (B). length of cantilever in feet from point of support for (C) and (D); or, if loaded at one point only (*see* below), length from point of support to position of load.

K = a variable quantity for different timbers.

For larch and cedar	$K = 1$
" Baltic fir	$K = \frac{9}{8}$
" American yellow pine	$K = \frac{8}{7}$
" beech and English oak	$K = \frac{7}{6}$

In the case of round spars b and d are identical, and their strength is only about $\frac{8}{10}$ that of square beams of the same depth.

4. To use these formulæ for a *concentrated* weight, such as a gun, the total weight on the gun wheels must be multiplied by two to convert it to the equivalent *distributed* weight, when it can be substituted for W. When, as in the case of a transom, the load is applied at several points, it can be taken as distributed.

5. With several baulks under a roadway, the two outer carry only half as much of any weight as the inner ones.

6. Rectangular beams should always be used on edge, in order to obtain the maximum of rigidity and strength. In calculating the sizes of beams by the formulæ in 1 and 2 above if b and d are unknown, d should be considered equal to $2b$.

A tapering spar, when supported at both ends and overloaded, will break in the centre.

iii. Table Giving Sizes of Round Roadbearers and Transoms (supported at the ends only) for Various Loads and Spans ($K = \frac{1}{3}$).

Loads on Bridge.	Round Spars required.	Mean Diameter in Inches.					
Infantry in file.	3 Roadbearers ... each	6	6½	7	7½	8½	9
	Transoms ... "	6½	7	7	7½	8	8
Cavalry in single file.	3 Roadbearers ... each	5	5½	6½	7	7½	8
	Transoms ... "	6	6	6½	7	7	7½
Infantry in fours.	5 Roadbearers ... each	6	6½	7	7½	8½	9
	Transoms ... "	9	9½	10	10½	11	11½
Cavalry in half-sections.	5 Roadbearers ... each	5	5½	6½	7	7½	8
	Transoms ... "	8	8½	9	9½	10	10
Q.F. 13-pr. gun, Marks I and II.	5 Roadbearers ... each	5½	6	6	6½	7	7½
	Transoms ... "	7	7	7½	7½	7½	7½
Q.F. 18-pr. gun, Marks I and II.	5 Roadbearers ... each	6	6	7	7	7½	7½
	Transoms ... "	7½	7½	8	8	8	8
5" Howitzer, Mark I.	5 Roadbearers ... each	6	6½	7	8	8½	9
	Transoms ... "	8	8	8½	8½	8½	8½
60-pr. gun in travelling position.	5 Roadbearers ... each	8	8½	9	9	9½	10
	Transoms ... "	10	10	10	10	10½	10½
4·7" gun on travelling carriage.	5 Roadbearers ... each	8½	9	9½	10	10½	10
	Transoms ... "	11	11	11	11	11	11
	Spans in feet ...	10	12	14	16	18	20

Other timbers not affected by length of bay:—

Ledgers and handrails, mean diameter, 4 inches to 6 inches.

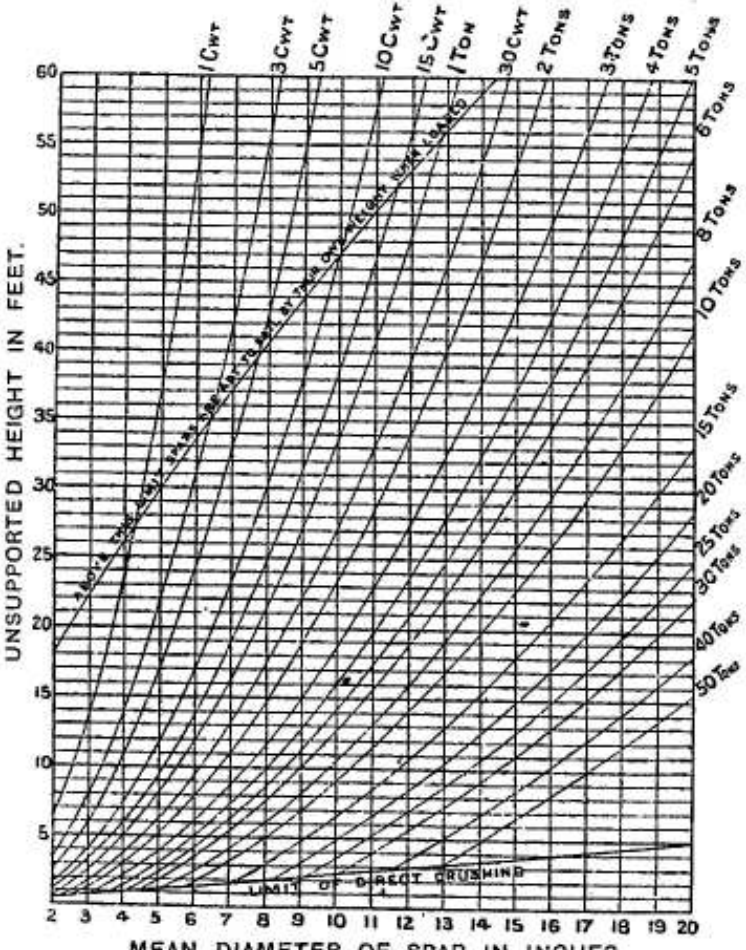
Braces and ribands, 3 inches at tip.

The depth (d) and breadth (b) of rectangular timber of equivalent strength to the round spars given in the above table can be found from the formula $bd^2 = \frac{\pi}{6} D^3$; where D is the mean diameter in inches given in the table. Some practical equivalents for ready reference are given below:—

D	b by d	D	b by d	D	b by d
3	2 by 3	6	3 by 6½	9	5 by 9½
3½	2 by 3½	6½	3 by 7¼	9½	5 by 10½
4	2 by 4½	7	3 by 8½	10	5 by 11½
4½	2 by 5½	7½	3 by 9	10½	5 by 12
5	3 by 5½	8	4 by 9	11	6 by 12
5½	3 by 6	8½	5 by 9	12	7 by 12

iv. Size of Timber for Trestle Legs.

From the following table the size of timber required for trestle legs can be found. It allows for factor of safety and for factor for live load, so that the actual load applied should be taken.



Baltic fir, "k" = 2.

Safe crushing stress taken as 1000 lbs. per sq. inch.

v. Formulæ for Calculating Buoyancy.

1. In using closed vessels such as casks for floating piers, the *safe* buoyancy for bridging purposes may be taken at $\frac{2}{3}$ the *actual* buoyancy.

2. When calculating the buoyancy required for a raft or pier for a floating bridge, it is necessary to work to the actual weight of the load to be carried, *plus that of the superstructure.* The superstructure of the actual roadway of a bridge of normal width to carry infantry in fours may be taken at 120 lbs. per foot run, up to 15 feet span.

3. The buoyancy of closed vessels can be determined with sufficient accuracy by the following methods:—

(a) When the contents are known—
Multiply the contents, in gallons, by 9, this will give the safe buoyancy in pounds.

(b) For casks, when the contents are not known—

$$\textit{Actual}\ \text{buoyancy} = 5C^2L - W\ \text{lbs.}$$

$$\text{Safe buoyancy} = \tfrac{2}{3}\left\{5C^2L - W\right\}\ \text{lbs.}$$

Where C is the circumference of the cask, in FEET, halfway between the bung and the extreme end; L is the extreme length, exclusive of projections, along the curve, in FEET; W is the weight of the cask in pounds.

4. The buoyancy of a log can be obtained by multiplying its cubic content by the difference between its weight per cubic foot and that of a cubic foot of water. One cubic foot of water = 6¼ gallons, and one gallon weighs 10 lbs.

As, however, timber absorbs a great deal of water, only ⅔ of the *actual* buoyancy thus found can be relied upon.

Thus, the *safe* buoyancy of a pine log of which the cubic content is 96 cubic feet would be:—

$$\tfrac{2}{3} \times 96 \times (62\tfrac{1}{2} - 40)$$
$$= 80 \times 22\tfrac{1}{2}$$
$$= 1{,}800\ \text{lbs.}$$

40 lbs. being the weight of a cubic foot of pine.

5. The contents in cubic feet of an unsquared log of timber can be found by the following rule:—

$$\frac{L}{4}(D^2 + Dd + d^2),$$

Where L = length of log in feet.
D, d = diameter at ends in feet.

29. FORDS.

1. The following depths are fordable:—
For infantry, 3 feet.
For cavalry, 4 feet.
Wagons containing ammunition, 2 feet 4 inches.

Gravelly bottoms are best, sandy bottoms are bad, as the sand gets stirred up and the depth of water thus increases.

2. All fords should be clearly marked by strong pickets driven into the river bed above and below the ford, their heads being connected by a strong rope which is securely anchored to holdfasts at each shore end. Marks should be made on those pickets which stand in the deepest water, at a height of 3 feet and 4 feet above the bottom, in order that any rise of water above the fordable depth may be at once evident.

3. The depth of a river is generally most uniform in straight parts; at bends the depth will generally be greater at the concave bank and less at the convex.

For this reason a river which is not anywhere fordable straight across may be found passable in a slanting direction between two bends.

The simplest plan for measuring the velocity of a stream is described in Section 12.

30. DEMOLITIONS WITH EXPLOSIVES.

1. The service explosives available for hasty demolitions in the field are guncotton and cordite. Other explosives may sometimes be obtained, the most likely being gunpowder and dynamite. Where a lifting effect is desired, gunpowder should be used; but, when a cutting or shattering effect is necessary, one of the others (high explosives) is better.

i. *Guncotton.*

1. A charge of wet guncotton is detonated by means of the explosion of a dry primer in close contact with it.

2. The slabs and primers for field service are as follows:—

(*a*) Slab.—Weight 15 ozs. Dimensions 6 inches × 3 inches × 1½ inches, with one perforation for the primer. Each slab is in an hermetically sealed copper-tinned case.

(*b*) Primer.—Weight 1 oz. Dimensions 1·35 inches to 1·15 inches in diameter by 1·25 inches long, with one perforation for the detonator. The primer is conical in form.

3. A charge is connected up for detonation as follows:—

The fuze (safety alone or safety with instantaneous) is cut to the required length. The end to be ignited is cut on a slant to expose as much of the composition as possible. The end to be inserted in the detonator is cut straight across. The straight cut end is then gently inserted into the open end of No. 8 detonator, from which the paper cap has been torn. This end of the detonator is then pinched (or with old-pattern detonator slightly bent) to make it grip on the fuze and so prevent its being withdrawn.

The primer having been tested to receive a detonator is placed in close contact with one of the slabs of the charge, either in one of the holes or tied to a slab, and the small end of the detonator is gently inserted into it so as to fill the entire length of the hole. If the hole is too large, a piece of paper or grass must be wrapped round the detonator to make it fit tight; if too small, it must be enlarged with a rectifier or piece of wood, *but not with the detonator.*

4. THE CHARGE MUST BE IN CLOSE CONTACT WITH THE OBJECT TO BE DEMOLISHED AND EACH SLAB MUST BE IN CONTACT WITH THOSE NEXT IT.

The charge must extend across the whole length of the object to be cut. One detonator is sufficient for a continuous guncotton charge.

5. The amount of guncotton (untamped) required for various charges can be calculated or obtained direct from the following table:—

Object attacked.	lb.	Remarks.
Masonry arch—haunch or crown	$\frac{3}{4}BT^2$	Continuous charges.
Masonry wall—up to 2 ft. thick	2 per foot	Length of breech B not to be less than the height of the wall to be brought down.
Masonry wall—over 2 ft. thick	$\frac{1}{2}BT^2$	
Masonry pier	$\frac{3}{4}BT^2$	
Hard wood—stockade or single	$3BT^2$	In a single charge outside. For a round timber charge $=3T^2$. Where the timber is not round, T = smaller axis. (Soft wood half this.)
Hard wood—auger hole ...	$\frac{3}{4}T^2$	
Stockade of earth between timber up to 3 ft. 6 ins. thick	4 per foot	Single charge outside.
Heavy rail stockade	7 per foot	
Fort gate	50	
Breechloading guns	—	For 8-inch gun use 2 lbs. Double the charge for every inch increase in calibre.
First class rail	*	Charge fastened against the web near a chair (if used).
Iron or steel plate	$\frac{3}{4}Bt^2$	t is in INCHES.
Frontier tower, stone and mud	—	5lbs. plus 1lb. per foot of longer side if rectangular, or of diameter if circular. In one charge in centre of tower.
Steel wire cable	1	Up to 5 inches circumference; above 5 inches $\frac{C^2}{24}$ C being the circumference in inches.

Where B = length to be demolished in FEET.
T = thickness to be demolished in FEET.
t = thickness to be demolished in INCHES (in the case of steel or iron plate only).

NOTE.—The charge is in lbs.; if the charge is tamped, the amount can be halved. Masonry includes concrete, stone, or brickwork.

In the presence of the enemy, charges may be placed hurriedly, and so under unfavourable conditions, and should therefore be increased by 50 per cent.

For emergency purposes BT^2 is effective with all classes of masonry and $2Bt^2$ for all steelwork. A slab will cut its own thickness of steel plate.

ii. *Cordite.*

1. For demolition purposes cordite is uncertain in its action and should only be used when no better explosive is available. The small sizes are the more reliable.

It is fired similarly to guncotton; a primer of guncotton or other high explosive must always be used.

No portion of a cordite charge should be more than 12 inches from a primer, since the rate of communicating detonation is slow.

2. Where good contact can be obtained, the power of cordite may be taken as equal to guncotton, otherwise a cordite charge should be increased by about 25 per cent.

iii. *Gunpowder.*

1. Gunpowder charges must be tamped, and should be made up in as compact a form as possible. The powder should be placed in a well-tarred sandbag, or, failing that, in one sandbag inside a second one.

The service sandbag will hold about 40 lbs.

2. The amount of gunpowder (tamped), required for various charges, can be calculated from the following table:—

Object attacked.	lbs.	Remarks.
Masonry arch—haunch or crown	$\frac{3}{8}BT^3$	Total amount divided into charges and placed at intervals of about twice the thickness of the masonry. Fire simultaneously.
Masonry wall		
Wood stockade—hard wood ...	40 to 100	One charge. Soft wood half this.
Stockade of earth between timber up to 3 ft 6 in. thick	100 per 7 ft.	Charges twice the thickness of stockade apart.
Fort gate	300	One charge.
Tunnels	$\frac{3}{8}T^3$	Where T = total distance from the surface of the lining to the charge.

iv. *Dynamites.*

1. Dynamites cannot be used after exposure to wet, which separates the nitro-glycerine and makes it dangerous.

2. Dynamites freeze at 40° F., and remain frozen at higher temperatures.

FROZEN DYNAMITES MUST NOT BE WARMED ON OR NEAR FIRES STOVES, OVENS, OR STEAM-PIPES; NOR EXPOSED TO THE DIRECT RAYS OF A TROPICAL SUN.

3. They are usually obtained in 2 oz. cartridges wrapped in parchment paper, in boxes of 5 and 50 lbs.

4. They can be detonated by fuze and No. 8 detonator, or by fuze and cap.

They are fired in a similar manner to guncotton, but no primer is required.

When a dynamite charge requires ramming, as in a bore hole, each cartridge must be gently squeezed into place with a wooden rammer, the fused one being the last.

v. *Fuzes.*

1. The present pattern of safety fuze is known as "Safety, No. 9."

It is coloured BLACK, and will burn under water.

2. For practical work the rate of burning can be taken at 4 feet per minute.

3. It is difficult to light safety fuze with a match or flame, the head of a match inserted in the fuze and lit by another match or rubbed by the prepared portion of a matchbox, is usually successful.

4. Instantaneous fuze is coloured ORANGE.

5. It burns at the rate of 30 yards a second, or practically instantaneously.

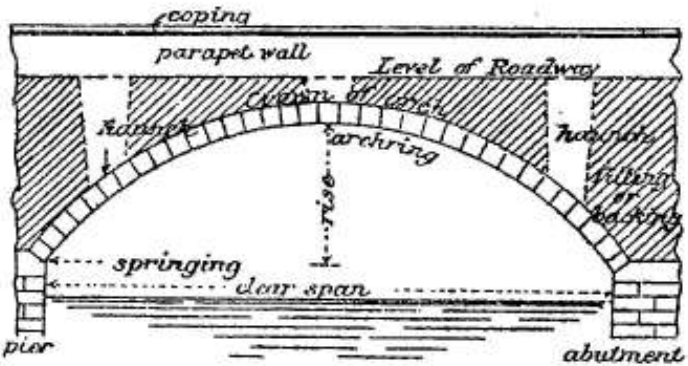
6. It can be distinguished in the dark from safety fuze by feeling the open crossed thread snaking round it.

7. Unless the safety of the firer or the depth of the tamping requires it, instantaneous fuze should not be used with safety fuze.

vi. SPECIAL CASES.

1. *Masonry or Brick Bridges.*—Use guncotton. Attack pier where thinnest; if possible, cut groove; or else tie charge to a board and fix it against pier.

Thick piers, attack haunches. Dig trench to back of arch ring at each haunch and lay charge. If time is short, attack the crown.



2. *Houses.*—(Weakly built), put charge in centre of each room or hearths of fireplaces, fire simultaneously. Mud huts up to 18 ft. square with walls 2 ft. thick at bottom, 4 lbs. guncotton in one corner. Four-room cottage, 6 to 12 lbs.

3. *Towers.*—Place charge in hole 2 to 3 ft. deep in centre of floor, tamp well. Charge in lbs. equal inside diameter or side in feet plus 5.

4. *Fort Gates.*—Guncotton 50 lbs. charge on ground or hung on nail. Gunpowder 200 lbs. tamped with sandbags.

5. *Iron or Steel Bridges.*—Use guncotton. Attack main girders near abutment. For hasty demolition of spans 20—80ft. $C = \frac{L^3}{15D}$

Where C = charge of guncotton in slabs (15 oz.) for one girder of single line of standard railway, L = length of girder in feet, D = total depth of girder in feet.

Where one girder has to bear the whole load of a line of railway, *e.g.*, two girders carrying a double line, or a centre girder carrying half of two single lines, the amount given by the formula should be doubled.

5. *Guns.*—Load with a shell, pack in charge in contact with shell and sides of chamber. Connect up charge, add sods, earth, etc., to keep it in place and to tamp it. Close breech as far as possible. A shell is not absolutely necessary, but charge must be tamped.

The charges required for guns from 3-inch to 6-inch calibre are given by the following rule:—

> "For a 3-inch gun use 2 lbs., and double the charge for every inch increase in calibre, *e.g.*, for a 4-inch gun use 4 lbs., and for a 5-inch, 8 lbs. With cordite charges add 20 per cent."

31. DEMOLITIONS WITHOUT EXPLOSIVES.

1. *Railways.*—Sever or block main lines of rails: remove technical tools and personnel: destroy signals, points and crossings, and water supply.

2. *Locomotives.*—Take off injector, piston or safety valve.

3. *Rolling Stock.*—Burn or remove springs. Trains may be run against each other, or a rail turned to block a line temporarily.

4. *Telegraphs.*—Cut down or break poles, cut up and twist wires.

5. *Guns.*—Close breech, then withdraw hand lever about 1 inch, and with handspike or pick beat down lever until hinge-joint is distorted. A few shots fired at carrier would jam mechanism still more.

6. *Arms.*—The best way is first to break off the butts and then to destroy the barrels. For the latter the rifle barrels with parts of the wood still on them, should be well heated over fire in a trench, after which they can be smashed up with heavy hammers. A party of five should be able to destroy 25 rifles in half an hour.

Ammunition to be destroyed should be placed in a deep pit and set on fire.

CHAPTER V.

32. SMALL ARMS AND GUNS.

1. Rifle, Short, Magazine, Lee-Enfield Pattern 1903.

Weight, without bayonet, 8 lb. 10½ oz.
" with " 9 lb. 11 oz.
Length, without " 3 ft. 8·5 ins.
" with " 5 ft. 2 ins.

Mark VI. 303" Ammunition.

Cartridge, length 3·05 ins., weight 415 grs., 20 rounds (in chargers) 22 oz.
Bullet, envelope cupro-nickel, length 1·25 ins., diameter (at base) ·311 in., weight 215 grs.
Charge, cordite, 31·5 grs.
Muzzle velocity, 2060 ft. per sec.

The following details are for Mark VII ·303 ammunition:—

Cartridge, weight 386 grs., 20 rounds (in chargers) 20 ozs.
Bullet, length 1·28 ins., weight 174 grs.
Charge, cordite M.D.T., 39 grs.
Muzzle velocity, 2440 ft. per sec.

2. Notes on the Use of Rifle on Service, etc.

Dangerous space decreases as the range increases.
Extent of dangerous space depends on—

Firer's position.
Height of object fired at.
Flatness of trajectory.
Conformation of ground.

In regard to—

The nearer rifle is to the ground ... ...
The higher the object fired at ... ...
The flatter the trajectory ... ...
The more nearly the slope of the ground conforms to the angle at which the bullet falls ... ...
} the greater is the dangerous space.

3. The accuracy of the short magazine L.E. rifle is not appreciably affected by fixing the bayonet, but with the long L.E. or the L.M. rifle additional elevation is required when the bayonet is fixed.

4. *More elevation is required—*

When the weather is cold.

Less elevation is required—

When the weather is hot.
High up (above sea level).
Firing up or down hill.

* With due regard to range power the ability of artillery to inflict heavy loss on troops moving in vulnerable formations is limited only by the possibility of the accurate observation and correction of fire.

5. *Rifles are sighted for the following conditions—*

Barometric pressure 30 inches (sea level).
Thermometer, 60° Fahrenheit.
Still air.
A horizontal line of sight.

6. The following rule for correction in case of variations in barometric pressure is approximately correct:—

For every inch the barometer rises or falls, add, or deduct, 1½ *yards per* 100 *yards of range.*

Thus a reduction of some 30 yards in 2,000 yards range would be required if the barometer stood at 29 inches.

The barometer falls about 1 inch for every 1,000 feet of altitude. Therefore, at an altitude of 5,000 feet it would, in normal conditions of weather, stand at 25 inches, and for 2,000 yards range the elevation required would be 1,850 yards only.

Every degree which the temperature rises or falls above and below 60° necessitates the subtraction or addition of about $\frac{1}{10}$th of a yard for each 100 yards of range.

7. *Ranges of objects are over-estimated—*

When kneeling or lying.
When both background and object are of a similar colour
On broken ground.
When looking over a valley or undulating ground.
In avenues, long streets, or ravines.
When the object lies in the shade.
When the object is viewed in mist or failing light.
When the object is only partially seen.
When heat is rising from the ground.

8. *Ranges of objects are under-estimated—*

When the sun is behind the observer.
In bright light or clear atmosphere.
When both background and object are of different colours.
When the intervening ground is level or covered with snow
When looking over water or a deep chasm.
When looking upwards or downwards.
When the object is large.

9. Details Regarding Ammunition of Field Guns and Howitzers.

—	13-Pr. Q.F.	18-Pr. Q.F.	60-Pr. B.L.	4.5-in. Q.F.Howr.	5-in. B.L. Howr.
Muzzle velocity ...	1,675 f.s.	1,500 f.s.	2,080 f.s.	1,010 f.s.	783 f.s.
Calibre	3 ins.	3·3 ins.	5 ins.	4.5 ins.	5 ins.
Weight of projectile ...	12½ lb.	18½ lb.	60 lb.	35 lb.	50 lb.
No. of rounds in limber	24	24	2	12	16
No. of rounds in wagon	33	38	36	33	32
No. of rounds in wagon limber	38	38	12	16	16
*Maximum range ...	6,100 yds.	6,300 yds.	9,500 yds.	7,300 yds.	3,400 yds.

*For time shrapnel.

10. Details of Artillery and Machine Gun Equipment.

Guns.	Weights. Gun and Carriage. cwt.	qrs.	lbs.	Gun, Carriage and Limber. cwt.	qrs.	lbs.	Behind Trans.* cwt.	qrs.	lbs.	Width between points of axletree arms. ft.	in.	Calibre ins.	Length of Carriage with Gun. ft.	ins.	Length of Limber, poles exclusive. ft.	ins.
13-pr. Q.F.	19	2	16	32	3	14	32	3	14	6	3	3	12	2	5	3
18-pr. Q.F.	24	3	21	40	0	16	40	0	16	6	3	3·2	18	8	5	4½
5" B.L. Howitzer	23	3	13	43	1	8	43	1	8	6	3	5	9	2½	5	6
4·5" Q.F. Howitzer †	26	3	14	41	3	0	41	3	0	6	3½	4½	12	3	5	7
60-pr. B.L.	91	3	7	108	1	7	108	1	7	6	6·5	5	21	7	7	7
Maxim Gun, I.F. Carriage III	...	...	...	...	...	...	9	3	20	6	6½	...	10	3	...	...
30-pr B.L. gun ... ... India	...	...	...	58	1	0	65	0	0	6	2	4	13	2	5	7½
4" B.L. gun ... ... ,,	55	0	0	67	7	10	...	...	...	...	...	4	12	8	...	...
5" B.L. gun ... ... ,,	73	0	0	85	7	10	...	...	...	6	7	5	14	3	5	8
10-pr. Mountain gun ... ... ,,	7	3	9	...	...	...	...	...	...	...	...	2·75	7	7½	...	..

Gun.	Mounting Tripod.	Gun and Tripod. cwt.	qrs.	lbs.
Maxim	Mark II	1	0	25
	,, III	1	0	18
	,, IV	1	0	17

* Without detachment. † Empty.

11. Details of Ammunition Wagons.

Wagon.	Weights.									Width overall.	Length.
	Without Limber.			With Limber.			Behind Team.				
	cwt.	qrs.	lbs.	cwt.	qrs.	lbs.	cwt.	qrs.	lbs.		
18-pr. Q.F.	15	3	9	30	2	28	30a	2	23	6' 8"	8' 4"
18-pr. Q.F.	18	3	0	35	2	25	35a	2	26	6' 3"	9' 5"
5" B.L. Howitzer { Mark I ...	23	2	13	46	1	8	45b	1	8	6' 2"	9' 2"
5" B.L. Howitzer { Mark II ...	20	1	18	48	3	13	48b	3	13	6' 2"	9' 2"
60-pr. B.L.	20	3	12	48	0	12	48a	0	12	6' 0"	8' 5"
4·5" Q.F. Howitzer	24	1	21	40	2	7	40	2	7	6' 3½"	9' 10"

a Without personal equipment and men
b Without men.

12. Approximate Number of Rounds provided in the Field per Gun.‡

Description of Gun.	With battery.	With brigade ammunition column.	With divisional ammunition column.	Total with field units.	To be maintained as L. of C.§	Total in the field.
13-pr. Q.F.	176	320*	144a	640	400	1,000
18-pr. Q.F.	176	302b	120	598	402	1,000
5-inch B.L. howitzer	88	70	92	250	250	500
4·5-inch Q.F. howitzer	108	92	66	266	534	800
60-pr.	80	100†	70	250	250	500

‡ A heavy battery consists of 4 pieces, all other batteries consist of 6 pieces.

* 76 rounds in ammunition wagons and 144 rounds in G.S. wagons.

a Each Divisional Ammunition Column carries this number of rounds per gun for one of the 6 R.H.A. batteries with the expeditionary force.

b 76 rounds in ammunition wagons and 126 rounds in G.S wagons.

† Ammunition column with the battery.

§ In bulk by the Army Ordnance Department.

13. Approximate Number of Rounds provided in the Field for Each Man Armed with the Rifle.

For each rifle of	With Unit. On soldier.	With Unit. Regimental reserve.	With brigade (gun) ammunition column.	With divisional ammunition column.	Total with field units.	First supply of reserve ammunition on L. of C.†	Total to be maintained in the field.
Cavalry and Irish Horse	100	100	100	100	400	100	500
Artillery	50‡	...	...	...	50	—	50
Engineers	50	50*	...	...	100	—	100
Mounted Infantry ...	100	100	100	100	400	100	500
Infantry	150	100	100	100	450	100	550
Army Service Corps ...	20	...	...	...	20	—	20
Army Ordnance Corps	20	...	...	...	20	—	20

* For dismounted men only.

† This reserve will, if necessary, be increased to 300 rounds per rifle for cavalry regiments, mounted infantry and infantry battalions as soon as possible after the commencement of the campaign.

‡ Per man.

NOTE.—For the purpose of arriving approximately at the number of rounds to be carried in ammunition columns, the number of rifles in units is calculated at 500 for cavalry regiments and M.I. battalions and at 1,000 for infantry battalions; other units are not considered.

14. Approximate Number of Rounds (·303-inch) Provided in the Field for Each Machine Gun

For each machine gun of	With Units. Service ammunition.	With Units. Regimental reserve.	With brigade gun ammunition column.	With divisional ammunition column.	Total with field units.	On L. of C.	Total in the field.
Cavalry	3,500	16,000	10,000	10,000	39,500	10,000	49,500
Mounted Infantry	3,500	16,000	10,000	10,000	39,500	10,000	49,500
Infantry	3,500	8,000	10,000	10,000	31,500	10,000	41,500

15. Approximate Number of Rounds provided in the Field for Each Pistol.

For each pistol a total of 36 rounds is carried in the field, viz., 12 rounds on the man, 12 rounds in regimental transport, and 12 rounds in the brigade (gun) ammunition column.

16. Scale and Distribution of Ammunition on Field Service in India:—

A.—Scale and Distribution of Gun Ammunition.

Distribution.	No. of Rounds per Gun*—							
	Horse Artillery.	Field Artillery.		Heavy Artillery.				Mountain Artillery.
	13 pr. Q.F.	18-pr. Q.F.	B.L. 5-inch Howitzer.	B.L. 30-pr.	B.L. 4-inch.	B.L. 5-inch.	B.L. 6-inch Howitzer.	B.L. 10-pr.
With Battery	176	176	88‡	100†	90†	106†	112‡	137§
With Ammunition Column	260	272	74†	109†	158†	78‖	84‡	98‖
With Ordnance Field Park:— In Advanced Depôts, Intermediate Depôts, and Base Depôt	564	552	838‖	231†	236†	316†	304‡	765¶
Total	1,000	1,000	1,000	500	500	500	500	1,000

* A heavy battery consists of 4 pieces, all other batteries consist of 6 pieces.
† 70 per cent. shrapnel shell and 30 per cent. common lyddite shell.
‡ 50 per cent. shrapnel shell and 50 per cent. common lyddite shell.
§ Includes 4 star shell, 5 common shell, and 128 shrapnel shell.
‖ Includes 7 star shell, 7 common shell, and 84 shrapnel shell.
¶ Includes 22 star shell, 28 common shell, and 715 shrapnel shell.

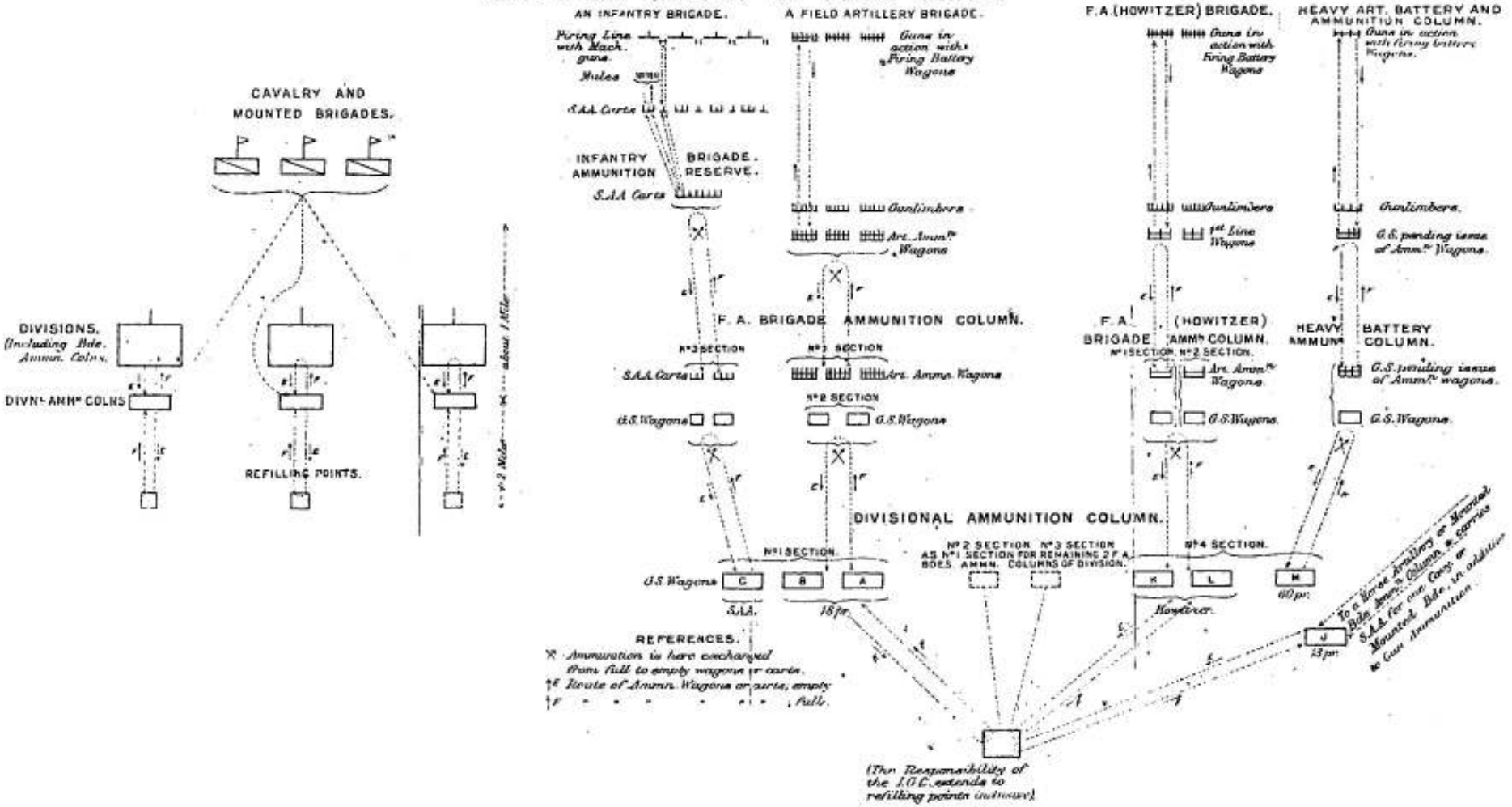
B.—Scale and Distribution of Small-arm and Machine gun Ammunition.

Distribution.	No. of Rounds per—									
	Pistol.		Rifle.							
	Artillery.	Other Arms.	British Cavalry.	Native Cavalry.	British Infantry.	Native Infantry.	Pioneers.	Mounted Infantry.	Sappers and Miners.	Machine Gun.
On the soldier	24	24	120	120	100	100	70	120	70	...
With Gun or Battery	26	...	...	...	...	...	...	...	...	6,000
With troop or Section Reserve	...	...	84	76	91	99	99	78	63	4,480
With Regimental Reserve ...	...	26	96	104	109	101	131	102	77	8,960
With Ammunition Column ...	...	...	175	175	175	175	175	175	100	10,560
With Ordnance Field Park— In Advanced Depôt, Intermediate Depôts, and Base Depôt	50	50	225	225	225	225	225	225	100	...
Total	100	100	700	700	700	700	700	700	400	30,000

NOTE.—The 120 rounds per rifle shown as carried by cavalrymen on the "soldier" will be distributed as follows:—

In the bandolier on the man	90 rounds
In the bandolier on the horse	30 rounds
Total	120 rounds

AMMUNITION SUPPLY OF FIELD UNITS.



Supply of Ammunition is carried out from the rear to front thus: the I.O.C. is responsible for supplying ammunition at the Refilling Point, the O.C. Divl. Ammn. Colⁿ takes over the Ammunition at the refilling point & is responsible for its conveyance to Bde. Ammn. Line and Bde. Ammn. Lines replenish the fighting line.
Refilling Points are the points at which the field units take over from the I. of C. organisations; they may be either on the railway or not according to circumstances.

To face page 123.

AMMUNITION SUPPLY OF A DIVISION.
(Not drawn to scale but indicates the succession Echelons from which the ammunition of units is replenished.)

* It should be noted that the revision of the existing system and chain of ammunition supply is at present under consideration.

33. SUPPLY OF AMMUNITION.†

i. System of Supply.

1. The administrative services deliver ammunition at the refilling points, where it is taken over by the fighting troops.

2. The reserves of ammunition with the fighting troops are divided into three lines as follows:—

(a) Divisional ammunition columns; form part of divisional artillery; are the connecting link between refilling points and brigade ammunition columns; are responsible for the transport of ammunition from the former to the latter.

(b) Brigade ammunition columns; form part of an artillery brigade; are the connecting link between divisional ammunition columns and infantry-brigade ammunition reserves and also battery wagon lines; are responsible for the transport of ammunition from themselves to the latter respectively.

(c) Regimental reserves consist of the ammunition carried on man, horse or gun, and on the pack, wheeled or other transport, which accompanies and forms part of each unit's establishment.

ii. Chain of Ammunition Supply.

1. The principle of the Ammunition Supply of Field Units is illustrated in Plate 15.

2. A divisional ammunition column is divided into 4 sections. Nos. 1, 2 and 3 sections are each divided into 3 subsections (A to I) and supply the whole of the 18 pr. ammunition and S.A.A. for the division, 2 subsections being allotted to the former and one subsection to the latter.

The successive echelons of ammunition supply from Nos. 1, 2 and 3 sections are identical and are therefore only given in detail in the case of No. 1 section to one Infantry Battalion and one F.A. Battery respectively, the system for the remaining units being the same.

No. 4 section divisional ammunition column is divided into 4 subsections (J to M). Of these subsections K and L carry Howitzer, and M 60 pr. ammunition for divisional troops; J carries 13 pr. ammunition for one mounted, or half a horse artillery brigade ammunition column, and S.A.A. for one cavalry or mounted brigade.

During an action the sections of the divisional ammunition column will be sent on to form reserves at convenient points off the road, from one to two miles in rear of the bde: ammunition column. These points will be fixed by divisional commanders, if necessary, under instructions from headquarters.

3. The supply from brigade and divisional ammunition columns is not necessarily restricted to troops of their own brigade or division. During an action any troops are to receive ammunition on demand from any column which may be at hand.

† It should be noted that the revision of the existing system and chain of ammunition supply is at present under consideration.

34. RATIONS, FUEL AND FORAGE.

I. Rations and Fuel.

How carried.	Field Ration.			Remarks
	1½ lb. fresh or 1 lb. (nominal) preserved or salt meat, 1½ lb. bread, or 1 lb. biscuits or flour.	Tea, sugar, jam, salt and pepper (as detailed in Allowance Regulations).	Vegetables: ¾ lb. fresh or 3 oz. dried, or ½ lb. preserved fruit.	
On the soldier	1(a)	...	...	(a) Preserved meat 1 lb. (nominal) and biscuit 1 lb. only as a "reserve" ration.
In cooking wagons... ...	1(b)	1(b)	1(b)	(b) The day's ration issued the previous evening less any portion consumed.
In Army Service Corps trains	1	2(c)	...(d)	(c) Carried in panniers.
In supply columns	1	1	1	(d) To be issued when available, but not to be carried in Army Service Corps trains when marching daily.
Total	4(e)	4(e)	2(e)	(e) Less any portion consumed of the ration carried on the cooking wagon.

Notes.

1. Rations for the divisional ammunition column are carried in supply wagons of the unit.

2. An emergency food (weight, 6½ oz. net, 9½ oz. gross) is carried on the soldier.

3. No fuel will be carried normally, except for mechanically-propelled vehicles, and the wood of the ration boxes which will be issued for kindling purposes, and be supplemented by fuel obtained locally.

4. Reserve parks each with a carrying capacity for 2 days' reserves (iron) rations will be available for use if required.

5. Limejuice and rum to be issued at the discretion of the General Officer Commanding, on the recommendation of the medical officer.

ii. Forage.

How carried.	Corn ration. 12 lb. (a)	Remarks.
On the horse	15	a In the case of heavy draught horses the corn ration is 15lbs.
In A.S.C. trains	1	b The day's ration issued the previous evening, less any portion consumed.
In supply columns	1	c Less any portion consumed of the ration carried on the horse.
Total	3c	

Notes.

1. The above scale of forage is applicable to a country where hay is available.
2. Forage for divisional ammunition column is carried in the supply wagons of the unit.
3. Reserve parks, each with carrying capacity for 2 days' reserve grain, will be available for use if required.
4. One bale of compressed forage (92 lb. gross weight) is carried in the locker of each G.S., G.S.R.E. and ambulance wagon.

iii. Rations.

In case of active operations in the field, a special scale of rations, dependent on the climate and the circumstances of the expedition, will be fixed by the G.O.C., and reported to the War Office, but the following scale will, as far as possible, be adopted as a guide:—

1½ lb. fresh meat, or 1 lb. (nominal) preserved meat or 1 lb salt meat.
1½ lb. bread, or 1 lb. biscuit, or 1 lb. flour.
⅜ oz. tea.
¼ lb. jam.
2 oz. sugar.
½ oz. salt.
$\frac{1}{16}$ oz. pepper.
½ lb. fresh vegetables, or 2 oz. dried vegetables, or 4 oz. preserved fruit.

$\frac{3}{20}$ gal. limejuice ($\frac{1}{10}$ gill) with ½ oz. sugar, on days when fresh vegetables are not issued ...	At the discretion of the general officer commanding, on the recommendation of the medical officer.
$\frac{1}{32}$ gal. rum (½ gill)	
Tobacco, not exceeding 2oz. per week, for those who smoke...	

iv. Table of Equivalents.

When it may be necessary or, in the opinion of the general officer commanding, expedient to depart from the scales before laid down, the following scale of equivalents will be followed:—

Coffee	1 oz.	= ½ oz. tea.
Oatmeal	2 oz.	= ¼ oz. bread or biscuit.
Biscuit	¾ lb.	= 1 lb. bread.
Rice	¾ lb.	= 1 lb. bread.
Salt meat	1 lb.	= Ration of meat.
Chocolate	½ oz.	= ¼ oz. tea.

TABLE OF EQUIVALENTS—*continued.*

Meat and vegetable ration		= Ration of meat (also vegetables in the field).
Pea soup (or Erbswurst) ...	3 oz. tin	= 3 oz. meat.
Porter	1 pint	= ½ gill spirits.
Preserved potatoes, uncooked	2 oz.	= ½ lb. ordinary fresh vegetables.
Rice or peas	2 oz.	
Onions or leeks	½ oz.	
Split peas	⅙ pt.	= ⅔ lb. flour.
Calavances	⅙ pt.	
Dal	⅙ pt.	
Oatmeal	⅓ pt.	

On active service, ½ lb. bacon or 2 ozs. cheese may be substituted, when available, for ½ lb. fresh meat or ½ ration of preserved meat.

v. MEAT AND VEGETABLE RATION.

This consists of ¾ lb. meat and ½ lb. vegetables, and gravy, put up in a convenient sized tin; gross weight, 1 lb. 13 oz.

EMERGENCY FOOD.

The emergency food, made of chocolate, with added proteid, is wrapped in vegetable parchment and put up in tins, each containing 6½ oz., in one cake of four sticks. The tin is closed by a lid hermetically sealed by a strip of metal which can be easily removed by hand, leaving the lid intact.

One emergency ration will be carried in the haversack by each soldier on service, and produced at inspection.

It is never to be opened except by the order of an officer, or when in extremity. It may be eaten dry or made into a beverage, but only small quantities should be used at a time. When so used, the contents of a tin are calculated to maintain strength for 36 hours.

vi. EXAMPLES OF NATIVE RATIONS.

Aden Camel Drivers—
- Rice, 1½ lb.
- Dates, wet, 1 lb.
- Ghi, 2 oz.
- Sugar, 2 oz.
- Coffee, ½ oz.
- Salt, ½ oz.
- Onions when procurable, 2 oz., or Dal, 4 oz.

South African Natives—
- Mealies, in the form of flour or meal, 1½ lb.
- Fresh meat, 1½ lb.
- Salt, ½ oz.

vii. FORAGE RATION.*

The ordinary ration for animals in camp is:—

—	Oats.	Hay.
	lb.	lb.
Horses...	15†	12†
Mules (15 hands)	12	12
Small mules	6	12

* 15 lb. for heavy draught horses.
† 16 lb. " " "

These rates may be varied on service by authority of G.O.C.

viii. Forage Equivalents.

Barley	1 lb.	All equivalent of each other.
Straw	2 lbs.	
Bran	1½ lb.	
Malt	¾ lb.	
Oatmeal	½ lb.	
Hay	1½ lb.	
Oats...	1 lb.	

Compressed forage ... 18 lbs. = 3 lbs. oats and 12 lbs. hay
or
Forage cake ... ... 20 lbs. = 12 lbs. oats and 12 lbs. hay

Indian rates for animals are:—

—	Oats, Barley, or Gram.	Hay.	Salt.
	lb.	lb.	oz.
Horses	8-10	20	1
M.I. ponies	6	20	¾
Ordnance mules	6	20	¾
1st class mules (baggage) ...	6	15	¾
R.A. bullocks	7	25	¾
Bullocks (transport)	6	20	¾
Camels	6	25	1¼
Pack bullocks	4	14	¾
Donkeys	3—4	10—13	¾

ix. Rations and Forage in India.

1. In estimating transport for food-supplies to be carried with troops, the approximate weight of rations, substitutes and extras (exclusive of emergency ration) may be taken at:—

British troops ... ... 2½ lbs.
Indian troops and followers ... 2½ lbs. } per ration, inclusive of packing.

Fuel, fresh meat, and such articles as will not be carried, such as fresh vegetables, have not been taken into account in this estimate.

In addition 3 lbs. of fuel may be carried per British and 1½ per Indian soldier.

Troops and followers will, as a rule, cut their own fuel in localities where this is practicable.

Of the meat ration, ⅔ lbs travels on the hoof.

Extras are issued on occasions.

2. The proportion of fighting men to followers in a division is:—

1 fighting man to ·52 followers and ·78 animals.

The average weight of daily grain ration for animals is:—

6½ lbs. per animal in a division ...
8 lbs. " " cavalry brigade ... ... } Includes all transport animals.

3. Supplies are carried in the field as follows:—

In the Cavalry Brigade.

Distribution.	British ranks.	Indian ranks.	Followers.	Horses.	Transport animals.
	Days.	Days.	Days.	Days.	Days.
On man or animal† ...	...	...	...	...	1
1st line transport ...	2	2	...	1	...
2nd line transport ...	2	2	4*	1	1
Supply column	3	3	3	1	1
Total ...	7	7	7	3	3

* The followers with the 1st line transport have 2 of the 4 days' rations with the 1st line.

† In addition every fighting man carries an emergency food, and every follower one day's ration (as an emergency food) on his person. All ranks also carry the unexpended portion of the current day's ration.

In the Infantry Brigade.

Distribution.	British ranks.	Native ranks.	Followers.	Horses.	Transport animals.
	Days.	Days.	Days.	Days.	Days.
On man or animal ..	...	...	...	...	1
1st line transport ...	...	...	...	...	...
2nd line transport ...	3	3	3	2	1
Supply column	4	4	4	1	1
Total ...	7	7	7	3	3

NOTE.—For the *divisional troops* as for the infantry brigade, except for the silladar cavalry horses which carry one day's ration on 1st and 2nd line transport and 1 day's with supply column.

ORDINARY DAILY RATIONS—INDIA

Detail.	Bread. (a)	Fresh Meat.	Vegetables.	Rice. (b)	Tea.	Sugar.	Salt.	Pepper.	Fuel. (c)	Atta or rice.	Dal.	Ghi.	Chillies.	Turmeric.	Ginger.	Garlic.	Gur.	Meat. (d)	Gur for non-meat eaters when meat is issued to others.
	lbs.	lbs.	lbs.	ozs.	ozs.	ozs.	ozs.	ozs.	lbs.	lbs.	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.
British troops	1	1½	1	2	1	2½	1	½	3	...	...	...	...	...	...	...	...	...	...
Indian troops and followers ...	...	...	...	...	½	...	1	...	1½	1½	4	2	½	½	¼	½	1	28	41

(a) 1½ lbs. when marching, or for the first 7 days of a halt.
(b) Three times a week.
(c) Troops will cut their own firewood where practicable.
(d) Weekly, issued as convenient.

LIVE STOCK.

Slaughter cattle furnish about 150 lbs. each of meat ready for cooking.
A sheep or goat furnishes about 25 lbs. of meat ready for cooking.

Scales of daily rations for animals on field service.

Detail	Horses of British Mounted Corps, Officers' Chargers, Non-Silladar Horses.		Mounted Infantry Ponies.	Silladar.		Ordnance.		Transport.		
	Colonial Horses and C. B. Horses with British Mounted Corps.	Arabs and other small Horses.		Horses.	Other Horses and Ponies including Mess Transport Animals.	Mules.	S. T. Bullocks.	Mountain Battery Baggage Mules.	A. T. Bullocks.	Camels.	Mules.*
Grain ... ... lbs.	10	8	6	8	5	6	7	6	6	6	5½
Bhoosa ... ... lbs. or Hay or dry grass ... ... lbs.	20	20	20	18	10	16	20	16	14	16	14
	20	20	20	20	10	20	25	15	20	25	14
Salt ... ... ozs.	1	1	1	1	½	½	¼	¾	½	¾	¼

* NOTE.—For purposes of calculation, transport mules may be taken as ⅓ first class and ⅔ second class. Consequently an average ration of 5½ lbs. grain and 14 lbs. bhoosa or hay or dry grass is approximately correct.

35 NOTES ON SUPPLIES.

I. Cattle.

Oxen should be between 2 and 5 years old. Should yield 600 lb. dead meat fit for issue.

Cows should be between 2 and 4 years old. Should yield 400 lb. dead meat fit for issue.

To estimate age of cattle:—

By the teeth. Incisors (front of lower jaw) are complete at 3½ years. At two years the two centre ones are well up. After incisors are complete, estimate must be made by amount of wear. Gums recede with age.

To estimate weight:—

Pass animals over weighbridge and then take 50 to 60 per cent. for dead meat.

Use this formula—

$$\frac{L\text{ (in feet)} \times 1 \times G^2\text{ (in feet)}}{3} = \text{weight in lb.}$$

L = length from hollow on crop (forepart of shoulder-blade) to root of tail.

G = girth close behind the shoulder.

Cattle in health should have:—eye bright, muzzle cool and moist, dung normal, coat glossy. Should stretch on rising and should chew the cud.

II. Sheep.

Ram is male sheep, wether is castrated male sheep, ewe is female after she has lambed.

Sheep should yield 50 to 80 lb. dead meat fit for issue and should not be more than 5 years' old. If it is possible to weigh a few, 50 to 60 per cent. of the average live weight may be taken as the amount of meat to be expected.

To estimate age of sheep:—

By the teeth. Teeth come up about 6 months earlier than those of cattle.

Sheep out of health have:—loose wool, dropping ears, arching back, legs drawn together under body, no fatty secretion under skin.

III. Other Animals.

Pigs should yield about 100 lb. dead meat fit for issue.

Animals should be deprived of food 12 hours before being slaughtered.

Meat loses when hung 1½ per cent. in 24 hours (in temperate climates).

" " 2 " 48 " " "

" " 2½ " 72 " " "

More would be lost in hot, dry climates.

IV. Bread.

Bread should be light, flaky and elastic; not acid; creamy white.

Crust should be brownish yellow and not burnt.

Biscuit should be light yellow, crisp, not burnt.

Army biscuit weighs 2 oz.

Flour should be pale cream white.

100 lb. wheat produces 70 lb. flour.

Flour is bought and sold by the sack of 280 lb.

100 lb. flour produces 130 lb. bread.

v. FORAGE.

Forage includes all articles of food consumed by animals used for military purposes.

1. Hay should smell sweet and should not be damp or dusty.

An acre of grass gives 1 to 2 tons of hay.

In England a truss of hay, old, should weigh 56 lb.
" " new " 60 "

A load of hay is 36 trusses. A ton of hay is 40 trusses.

The weight of hay per cubic yard in the stack varies from 112 lbs. to 300 lbs., depending on the nature of the hay, its age, the size of the stack and the part of the stack taken. 250 lbs. is a fair average.

2. Straw should be long, stout, clean, sweet, dry; wheat straw best.

Straw weighs 36 lb. to truss. A load of straw is 36 trusses.

To estimate contents of stack of hay or straw—

$$\text{Hay } \frac{\text{height} \times \text{breadth} \times \text{length}}{11} = \text{tons of hay.}$$

$$\text{Straw } \frac{\text{height} \times \text{breadth} \times \text{length}}{16} = \text{tons of straw.}$$

Dimensions in yards—

Height = distance from ground to eaves + half the distance from eaves to ridge.

Circular stack—

$$\frac{3\frac{1}{7} \times \text{radius}^2 \times \text{height}}{11} = \text{tons of hay.}$$

$$\frac{3\frac{1}{7} \times \text{radius}^2 \times \text{height}}{16} = \text{tons of straw.}$$

Height = distance from the ground to eaves + one-third the distance from eaves to apex.

As a rough guide in making calculations 9 men should cut from the stack, weigh and tie 15 trusses (840 lb.) hay in an hour. Half an hour extra should be allowed for preparations, e.g., unroofing the stack.

3. Oats should be free from dirt, sweet, thin husked, hard.

Oats should weigh from 38 lb. upwards to the bushel.

Squeeze an oat, the kernel should leave the husk.

An acre of oats yields 40–60 bushels and 1½ tons straw.

Substitute for oats are maize, barley, grain.

4. Acre of barley yields about 40 bushels (50 lb. to bushel) (1 ton straw).

Acre of wheat yields about 25-30 bushels (60 lb. to bushel) (1½ ton straw).

5. Bran is composed of the two outer envelopes of the wheat grain, and should be dry, clean, sweet. Dry it is astringent, wet laxative.

6. Beans should be hard, dry, sweet, sound. Should be split before being given to animals. Weight 65 lb. to the bushel.

7. Peas should be dry, sound. Weight 63 lb. to the bushel.

8. Compressed forage is a mixture of hay and oats. Ration for horse 20 lb. daily. Ton occupies 45 cubic feet. Bale weighs 82 lb. gross.

9. Linseed should be clean, round, large, plump. It is the seed of the flax plant. Is soothing and laxative.

10. Green foods are rye grass, lucerne, sainfoin, clover.

11. Other foods are potatoes, carrots, khertil, cherri (millet stalks), bhoosa, goor, oil-cake, Maltese clover, sugar cane, &c.

Acre of potatoes yields about 8 tons.
" carrots " 10 to 20 tons.
" cabbage " 35 " 40 "

12. In India (Western) the average yield per acre of certain crops is as follows:—

Gram	500—600 lb.
Barley	1,500—1,800 lb.
Wheat	600—650 lb.
Potatoes ...	10,200 lb.
Oats	1,800—2,200 lb.
Carrots... ...	25,000 lb.
Hay	1,200 lb.

13. If bhoosa is in stacks (which are almost always circular across the border) the contents may be calculated by the following formula:—

Divide the square of average girth of the stack by 12 and then multiply the result by the perpendicular height. This will give the contents of the stack from eaves to the ground. For the conical top, multiply the area at the eaves (i.e., the square of the girth divided by 12) by ⅓rd of the perpendicular height from the eaves to the ridge. The contents may be estimated at about 6½ lbs. per cubic foot.

14. When foraging across the Indian frontier look for food stuffs as follows:—

Waziristan.—Buried beneath the floor of their huts.
Baluchistan.—Hidden in *karezes* and nullahs.
Tirah.—Behind false walls in houses.
Swat, Bajaur and Buner.—In partitions and compartments built on to inside walls of houses.
Burma.—In granaries in the fields; usually no concealment.

36. SUPPLY ARRANGEMENTS.

The director of supplies is responsible for the supply of an army, and is assisted by assistant directors of supplies. He receives instructions from the Q.M.G.'s branch of the staff.

1. When troops operating in a civilized theatre of war are not wholly subsisted in billets by the inhabitants, nor dependent upon supplies requisitioned either in advance or in their immediate neighbourhood, the means of supplying them will normally be effected by rail and fast-moving mechanical transport, delivering daily to Army Service Corps units, designated "Trains" (the composition of which is shown hereafter), and thence to the troops.

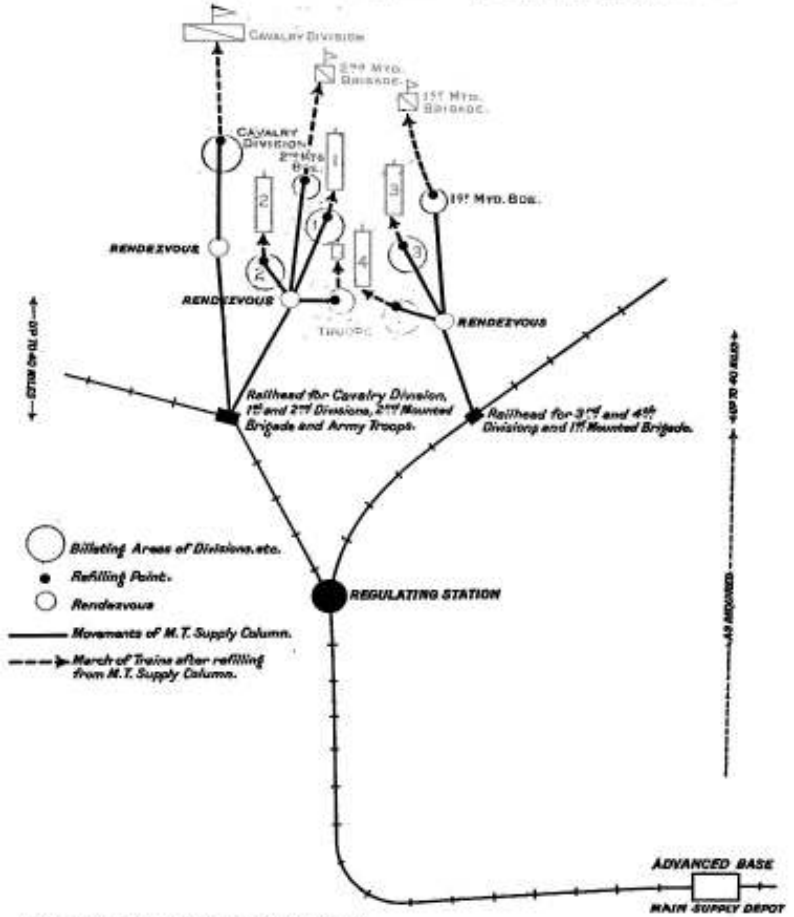
The attached Plates 15 and 16A indicate the system to be adopted.

2. *Supply depôt.*—Main supply depôts will be established at advanced bases, or at convenient positions on the railway; they will be filled up by rail, according to the stocks authorized, from the overseas base, or from supplies collected from the country.

Field bakeries and butcheries will be established at the advanced bases, or at convenient points on the railway line other than the regulating station. It may be necessary to establish field butcheries in advance of the railway.

3. *Regulating station.*—All supplies will be despatched by rail, in the charge of a Railway Supply Detachment, as required, from these main supply depôts to a regulating station, where railway trains will be marshalled, and thence despatched daily to railheads conveniently situated for the supply of the troops.

ILLUSTRATING SUPPLY SERVICE IN AN ARMY OF 4 DIVISIONS, 1 CAVALRY DIVISION, 2 MOUNTED BRIGADES, AND OTHER ARMY TROOPS, WHEN THE FORCE IS MARCHING.



NOTE.—This Diagram is not drawn to scale, nor does it represent the tactical positions of fighting troops, but merely indicates the system under which troops would be supplied when marching.

To face page 132.

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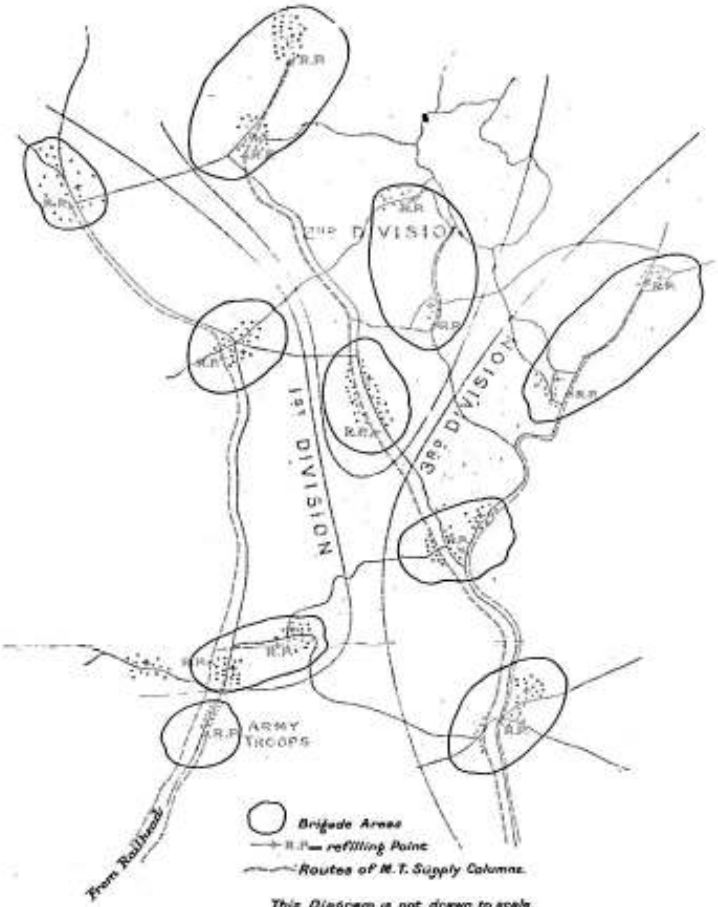
ILLUSTRATING SUPPLY SERVICE FOR THREE DIVISIONS AND ARMY TROOPS, WHEN STATIONARY.



To follow Plate 16.

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4. *Railheads.*—At the railheads the supplies will be received by Supply Columns (mechanical transport), and conveyed thence usually to rendezvous situated not more than 40 miles distant from the railheads.

5. *Refilling points.*—(a) On arrival at the rendezvous, the supply columns will be ordered to proceed to refilling points situated, when troops are marching, at the heads of the areas from which the divisions moved the same morning. (*See* Diagram I.) Here they will hand over their loads to the Supply sections of the "Trains," and return to the next day's railheads without delay.

The reason for placing refilling points in these positions is that it is proposed to fill the Supply sections of the "Trains" after the troops have quitted the areas where they spent the previous night, and in this manner to obviate any retrograde movement by the horse transport.

The distance between the rendezvous and the refilling points will usually be from about 3 to 7 miles.

(b) Rendezvous are not always necessary, and are used only when refilling points cannot be fixed in sufficient time for adequate notice of their positions to be given to the Inspector-General of Communications. If refilling points can be decided when demands for supplies are forwarded to the Inspector-General of Communications, the Supply Columns will move to them direct.

(c) When troops are stationary, except during battle, it will usually be preferable to send the Supply Columns into brigade areas (*see* Diagram II.), where the refilling points will be placed, thus obviating the necessity for transferring supplies from the columns to the "Trains," and for working the horses of the "Trains."

(d) During battle it will probably be necessary to send back the "Trains" some distance to refill from the Supply Columns (*see* Diagram III.), more than one refilling point being, if possible, arranged for each division with the object of reducing to a minimum the movements of the Supply sections. The positions for the refilling points of a division may be fixed by Army Headquarters, if it is desired to control the movements of transport in any particular area.

6. "*Trains.*"—The Supply sections of the "Trains" when full will go forward to the troops.

The movements of the Supply sections are dependent on those of the Supply Columns. Normally the latter should reach the refilling points between 9 a.m. and 10 a.m., having left the railhead or its vicinity in the early morning.

7. *Supply Columns* (*M.T.*).—For the daily replenishment of the Supply sections of Trains, Supply Columns of fast moving mechanical transport will be formed, designated as follows:—

Cavalry Supply Column.
Divisional Supply Columns.
Army Troops Supply Column.

The last-named including provision for the Mounted Brigades.

Reserve Parks (Horse).—Horsed Reserve Parks, each capable of carrying 2 days' reserve (iron) rations and 2 days' grain for a division plus one-sixth of the Cavalry Divisional and Army Troops, will be maintained for use in case of emergency.

37. REQUISITIONS.

1. Subject to orders issued by C.-in-C. the D. of S. may delegate authority to requisition or purchase supplies to his representative with units or detachments.

2. Commanders are responsible that the inhabitants are treated with every consideration, and also that acts of hostility or resistance on their part are promptly quelled.

3. Commanders ordering a requisition will be guided by local conditions as to the quantity of food which should be left in the possession of inhabitants. The usual practice is to leave at least three days' supply of food for a household, and rather more than this at outlying farms and villages.

4. Requisitioning should be carried out through the local civil authorities. Direct contact between troops and inhabitants should be avoided.

5. Indiscriminate requisitioning and granting of receipt notes by unauthorized persons is strictly forbidden.

In cases of emergency, *e.g.*, on patrol duty, or where no officer of a service or department, or duly appointed requisitioning officer is available, requisitions may be carried out by the officer or soldier in immediate command, the circumstances being reported without delay to superior authority.

In these circumstances the following form may be used, provided Army Book 361 is not available.

6. A requisition receipt note must be given for articles or services requisitioned, whether taken for the use of troops, for protection, or destroyed. (When goods are taken for the two latter purposes, a statement to this effect must be written on the note.)

When payment is made on the spot, no receipt whatever should be given.

7. The articles requisitioned must be fully described, and the weight of the goods taken must be inserted on the note; it is not sufficient to merely state the number of bags or cases

8. No money value is to be quoted on the receipt note.

No.

Purchased, hired, or requisitioned from :—

Name.....

Address.....

.....

Date .....

Articles or Services :—

(Counterfoil.)

Reported to :—

Date of Report :—

O.H.M.S. No.

(Not negotiable.)

I have purchased (hired or requisitioned) from

(Here insert name and address of seller)

for the use of

(Here insert unit, detachment, brigade, division, etc.)

the following articles (or services) :—

Articles or Services.	Quantity.	Authority to whom purchase, etc., is reported.	Remarks.

To be delivered to officer commanding at

(Here insert nearest garrison or fixed post)

within one month from this date.

Place.

Date.

Name, rank, and regiment or appointment (if any) of officer.

CHAPTER VI.

38. TRANSPORT.

1. The transport of a force is divided into:—
   (a) Transport on the Lines of Communication.
   (b) Transport with Field Units.

2. Transport on the L. of C. comprises (a) Railway transport; (b) Road transport; (c) Inland water transport.

The traffic arrangements under all three heads are co-ordinated by the I.G.C., who is responsible for the punctual movements of the army's requirements between the base and railling points inclusive.

3. The administrative and executive control of *railway transport* is vested in the director of railways, who is responsible to the I.G.C. for the efficiency of everything connected with that service.

For the defence of a railway and of working parties on it the commander of the L. of C. defences is solely responsible.

4. The representative of the director of transport at the headquarters of the I.G.C. is responsible for all *road transport* on the L. of C.

It is divided into three classes:—

(a) Transport working between railhead and the advanced bases, including the railling points. It is normally composed of auxiliary transport companies found by the A.S.C. (see W.E.), and forms the connecting link between the railway and the ammunition or transport and supply columns and parks of the army.

(b) Transport to supplement the railway. It works between the base and railhead or along such portion of the railway lines as may be decided on by the I.G.C. It is composed of hired, purchased or requisitioned vehicles. On good roads mechanical transport would be specially suitable.

(c) Transport for local work at the base or at posts on the L. of C.

5. When *inland waterways* are used on a large scale, a separate director may be appointed, who will be directly responsible for this service to the I.G.C. Under other circumstances, the organization of this service may be delegated to a representative of the director of transport.

6. Responsibility for the allotment, and punctual replacement of all deficiencies in *transport with field units*, other than technical vehicles of artillery and engineer units, is vested in the director of transport

The O.C. a "Train" supervises all transport in the formation to which he is attached.

The Regimental Transport officer is responsible to his C.O. for the efficiency of vehicles, animals and equipment of 1st and 2nd line transport of his unit.

7. *Transport with field units* is known as regimental transport and is divided into two classes:—

(a) The transport of fighting units, which is again divided into first and second line transport.

(b) The transport of administrative units (*i.e.*, field ambulances, cavalry field ambulances, trains columns and parks), which is not sub-divided but marches with the unit as a whole.

8. First line transport is an integral part of a fighting unit, by which it must be accompanied at all times. It includes gun

limbers and carriages, ammunition wagons, pack animals, limbered or G.S. wagons or carts carrying ammunition, tools, machine guns or technical engineer stores and water carts. On concentration, cook's carts and wagons will be transferred from trains to units.

9. Second line transport is that allotted to fighting units for the conveyance of the baggage, stores, and supplies necessary for their subsistence and consists of the remaining vehicles of regimental transport.

On arrival in the area of concentration, 2nd line transport will be withdrawn from units and organized as "Trains" under the A.S.C.

The baggage of R.E. units, divisional ammunition column and field ambulances remains with those units.

10. For headquarter units both first and second line transport personnel is, with certain exceptions, provided by the A.S.C.

For other units, personnel for first line transport is found by the unit itself from men fully trained in the tactical duties of the arm, and for second line transport and transport of administrative units is found by the A.S.C.

11. Commanders of units are responsible for the care and efficiency of the personnel, animals, vehicles and equipment of all the regimental transport of their units. Indents to replace deficiencies will be forwarded direct to the representative of the director of transport at the headquarters of the division or other formation to which the unit belongs.

12. Each company of the "Train" will be organized in two sections, viz., Baggage Section and Supply Section.

When fighting is imminent the baggage and supply sections should usually march together.

In other circumstances the hour of movement for the baggage section will be regulated by the requirements of the troops, whose baggage should be available as soon as they have occupied their new quarters.

Any necessary orders for the movements of baggage sections will normally be issued by divisional headquarters unless Army Headquarters desire to control these movements as an exceptional measure. The responsibility of subordinate commanders in regard to baggage sections is limited to the period when the vehicles are in brigade areas.

13. For space occupied by transport on the march see pp. 31-34.

For allotment of transport to units and description of the same see pp. 138-141.

14. Indian Transport.—The question of Indian transport is outside the scope of this book, but each unit is equipped with pack mules for 1st line transport. 2nd line transport is carried on the most suitable transport available, generally camels. Water supply and men's great coats on summer scale or one blanket per man on winter scale are carried on mules to allow of their accompanying the 1st line when required. On winter scale the men carry their own great coats.

The 2nd line transport of a unit consists of mules, carts, bullocks, camels, ponies, or coolies, in accordance with circumstances.

15. Carriers—Organized into gangs of 20, 1 headman to each gang; 4 gangs to a section; 1 conductor to a section; carriers numbered and registered, and given a disc with number.

16. A good draught horse should draw a weight of about 1,200 lb., about 20 miles per day; walk about 3 miles an hour, and trot at an average rate of 6 miles. He requires a space of 3' 0" × 9' 0" standing, and, at sea, a measurement space of 9 tons. He pulls equal to six men, and his average weight should be about 11 cwt.

REGIMENTAL TRANSPORT.

1st Line.

In addition to the transport shown below cooker vehicles will be received from A.S.C. Trains on concentration.

Name of Unit.	One-horse.		Two-horse.							Four-horse.						Six-horse.													
	Maltese Carts.	Water Carts.	Maltese Carts.	Forage Carts.	S.A.A. Cart.	Carts, Cable.	Wagons, Timbered, G.S.	Wagons, Light Spring.	Carts, Tool, R.E.	G.S., for Technical Stores.	Wagons, Cable.	Wagons, Timbered, G.S.	Wagons, Spring, Field Troop.	Wagons, Air Line.	Wagons, Reservoir Use.	Gun Carriages.	Carts, Tool, R.E.(r)	Ammunition Wagons.	Wagons, Air Line.	G.S., for Technical Stores.	G.S., for Ammunition.	Wagons for Collapsible Boats.	Wagons, Trestle.	Wagons, Pontoon.	Wagons, Special, for Wireless Telegraph Co.	Spare Horses.	Pack Animals.	Motor Cars.	bicycles.
Hd. Qrs. of a Cav. Divn.		1																									2	15	12
" a Divn.		1																									2	4	8
" a Cav. Bde.																													6
" a Mtd. Bde.																												3	6
" an Inf. Bde.				1						1*																	2		1
Cav. Regt., Hd. Qrs. and Mach. Gun Sec.		1	1									4															1		2
" Squadron												2															2		2
" complete		1	1									10															6	7	8
Hd. Qrs. Cav. Divl. or Divl. Art.																													2
H.A. Batty. (13-pr.)		1														6		13								22			1
" Ammn. Coln. (13-pr.)		1						6										13			30					30			1
" Bde. (13-pr.)		2		1			1	6								12		56			20					70	1		4
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
H.A. with Mtd. Bde., batty.			1	1													1	12								22	1		1
" " " Ammn. Coln																		6			10					13			1
" " " Total			2	1												6		18			10					35	1		2
F.A. Batty. (18-pr.)			1													6		12								18			1
" Ammn. Coln. (18-pr.)			1			7												18			30					34			
" Bde. (18-pr.)			4	1		7	1									16		54			30					88	1		4
" Batty. (5" Howr.)			1													6		9								14			1
" Ammn. Coln. (5" Howr.)			1															6			12					11			
" Bde. (5" Howr.)			3				1									12		24			12					42	1		3
" Batty. (4·5" Howr.)			1													6		12											1
" Ammn. Coln. (4·5" Howr.)			1															13			12								
" Bde (4·5" Howr.)			4	1			1									18		54			12								4
Heavy Batty. (60-pr.)			1				1			2						4		8								14			1
" Ammn. Coln (60-pr.)			1	1						1								4			6					8			
Heavy Batty. and Ammn. Coln. (60-pr.)			1				1			3						41		13			6					23			1
Divl. Ammn. Coln. with 5" Howr.	1		2																		140					23	1		5
Divl. Ammn. Coln. with 4·5" Howr.	1		2																		134								5
Hd. Qrs. Cav. Divl. or Divl. Eng.	1c																										1		1
Field Troop			1							1			2				4					1	1			3	1		1
Field Company			1		4				8	1														2		5	4		1
Wireless Telegraph Company			1				3	6																6d		5	9		4
Divl. Telegraph Company								2			3															2			1
Signal Company (Cable)			1					10			9															6			1
Signal Company (Air Line)			1					2		4e	2			6					6							10			1
Balloon Company			1							2e						6				16					4	4			1
Bridging Train		1	1							4e														2		16	1		1
M.I. Battalion			1	1								11														7	1		8
M.I. Company												2														2	2		2
Infantry Battalion		1				4		3																		8	16		3

* G.S. for entrenching tools. † With 8 horses each. ‡ With 4 horses each. § 7 of each have only 4 horses each.
(a) 2 horses in the case of a cavalry division. (b) G.S.R.E. for balloon and kites. (c) G.S.R.E. wagons.
(d) Includes one 4-horsed. (e) Twelve horses are allowed for the four tool carts with each Field Troop.

REGIMENTAL TRANSPORT.

2nd *Line.*

On concentration the transport shown below, except in the case of the divisional ammunition column, will be transferred to A.S.C. Trains.

Name of Unit.	Two-horse. Carts, Forage.	Four-horse. Wagons, G.S., for Baggage, Stores and Supplies.	Six-horse. Wagons, G.S., for Baggage, Stores and Supplies.	Spare Horses.	Pack Animals.
Hd. Qrs. of a Cav. Div.	...	2	...	...	...
" of a Division	...	2	...	...	...
" of a Cav. Bde.	...	1	...	...	...
" of a Mtd. Bde.	...	1	...	...	...
" of an Inf. Bde.	...	1	...	...	...
Cav. Regt. Hd. Qrs. & M.G. Section	...	1	...	...	...
" " Squadron	...	2	...	...	...
" " complete	...	7	...	...	...
Hd. Qrs. Cav. Divl., or Divl. Art.... ...	...	1	...	...	...
H.A. Batty. (18-pr.)	...	...	2	...	...
" Ammn. Coln. (15-pr.)	...	5	...	...	...
" Bde. (18-pr.)	...	6	4	...	...
H.A. with Mtd. Bde. Batty....	...	3	...	...	...
" " " " Ammn. Coln. ...	...	2	...	...	...
" " " " Total	...	5	...	...	...
F.A. Batty. (18-pr.)	...	2	...	...	...
" Ammn. Coln. (18-pr.)	...	4	...	...	...
" Bde. (18-pr.)	...	11	...	...	...
" Batty. (4·5" or 5" Howr.)	...	2	...	...	...
" Ammn. Coln. (4·5" or 5" Howr.) ...	...	3	...	...	...
" Bde. (5" Howr.)	...	8	...	...	...
" Bde. (4·5" Howr.)	...	10	...	...	...
Heavy Batty. (60-pr.)	...	2	...	...	...
Heavy Ammn. Coln. (60-pr.)	...	1	...	...	...
Heavy Batty. and Ammn. Coln. (60-pr.) ...	...	3	...	...	...
Divl. Ammn. Coln.	...	13	...	...	...
Hd. Qrs., Cav. Divl., or Divl. Eng. ...	1	...	...	...	...
Field Troop	...	...	...	...	...
" Co.	...	...	...	...	...
Wireless Telegraph Co.	...	...	...	...	...
Divl. Telegraph Co.	...	...	...	...	...
Signal Co. (Cable)	...	...	...	...	...
Signal Co. (Air Line)	...	...	...	...	...
Balloon Co.	...	...	...	...	...
Bridging Train	...	...	...	...	...
M.T. Battalion	...	7	...	...	...
M.L. Co.	...	2	...	...	...
Inf. Bn.	...	4	...	...	...

FIELD AMBULANCES AND TRAINS.

(not divided into 1st and 2nd Line Transport, see page 137.)

The trains include cooks' vehicles which will be transferred to other units on concentration, but excludes the 2nd line transport of units which will be handed over to trains on concentration.

Name of Unit.	Cooks' Vehicles.		Water Carts.	Carts, Forage.	Wagons, G.S., for Baggage, Stores, and Supplies.	Wagons, Ambulance.			Spare Horses.	Pack Animals.		Bicycles.	Motor Cars.
	3-horsed.	4-horsed.	Two-horse.		Four-horse.	2-horse.	4-horse.	6-horse.					
Cav. Train	10	39	5	22a	11	...	...	...	39	1	37	5	
Div. Train	12	97	4	12b	14	...	...	...	93	1	30	4	
Army Troops Train ...	11	5	1	5b	12	...	...	...	10	1	9	1	
Mtd. Bde. Train	1	7	1	3	3	...	...	...	5	1	9	1	
Cav. Field Ambulance ...	...	...	2	2	2	6	...	4	6	...	2	...	
Field Ambulance	...	...	3	3	6	...	10	...	8	...	1	...	

(a) Includes 1 Maltese cart with 2 horses.
(b) Includes 1 Maltese cart with 1 horse.

To convert the above transport tables into any form of transport required, allow 700 lbs. load to be carried for every horse in draught. For example, a battalion of infantry has in 2nd Line Regimental Transport 16 horses in draught (excluding water-carts); this represents a load of 11,200 lbs. If it is required to carry this on camels, each camel carrying 320 lbs., we can easily reckon we shall want 35 camels, with such percentage of spare camels as circumstances seem to demand. In the same way by using the information which follows, the number of mules, bullocks, coolies, &c., can be calculated.

NOTE.—No blankets for men are included in the normal scale of war outfit, but one blanket per man will be carried when specially ordered. This will necessitate the following additions to regimental transport:—

Infantry Battalion—2 G.S. wagons with 4 horses each.
Cavalry Field Ambulance—2 forage carts with 2 horses each.
Field Ambulance—3 forage carts with 2 horses each.

INDIA

REGIMENTAL TRANSPORT (WINTER SCALE).

1st Line.

Detail.	Without Tents.								With Tents.								Remarks.
	Pack Mules.	Draught Mules.	Mule Carts.	Camels.	Bullocks.	Bullock Carts.	Tongas.	Personnel.	Pack Mules.	Draught Mules.	Mule Carts.	Camels.	Bullocks.	Bullock Carts.	Tongas.	Personnel.	
H.Q. of a Div. (Mxd. Bdes.)	41	...	...	...	...	...	...	12	41	...	...	...	...	...	...	12	
do. Cav. Bde.	15	...	...	...	...	...	...	5	15	...	...	...	...	...	...	5	
do. Mxd. Inf. Bde.	14	...	...	...	...	...	...	4	14	...	...	...	...	...	...	4	
do. British Inf. Bde.	11	...	...	...	...	...	...	3	11	...	...	...	...	...	...	3	
Cav. Regt. (British)	159	...	...	...	...	...	...	63	159	...	...	...	...	...	...	63	
do. do. squadron	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
do. (Indian silladar)	160	...	...	...	...	...	...	58	160	...	...	...	...	...	...	58	
H.A. Battery	35	...	...	...	...	...	...	14	58	...	...	...	...	...	...	14	
H.Q. F.A. Brigade	3	...	...	...	...	...	...	1	3	...	...	...	...	...	...	1	
F.A. Battery	11	...	...	...	...	...	...	4	11	...	...	...	...	...	...	4	
M.A. Battery (British)	10	...	...	...	...	...	...	3	10	...	...	...	...	...	...	3	
Cav. Bde. Amun. Column	3	...	...	...	...	...	...	1	3	...	...	...	...	...	...	1	
Divl. Amun. Column	11	...	...	...	...	...	...	4	11	...	...	...	...	...	...	4	
H.Q. Div. Engineers	4	...	...	...	...	...	...	1	4	...	...	...	...	...	...	1	
Field Troop R.E.	13	...	...	...	...	...	...	3	16	...	...	...	...	...	...	3	
Field Co. Sappers & Miners	59	...	...	...	...	...	...	28	59	...	...	...	...	...	...	28	
Infantry Bn. (British)	126	...	...	...	...	...	...	48	120	...	...	...	...	...	...	48	8 mules and 1 personnel less for summer.
do. (Indian)	162	...	...	...	...	...	...	42	111	...	...	...	...	...	...	43	
do. Pioneers	153	...	...	...	...	...	...	48	123	...	...	...	...	...	...	48	
Field Ambulance (British)	9	...	...	...	...	...	...	3	9	...	...	...	...	...	...	3	
do. do. (Indian)	9	...	...	...	...	...	...	3	9	...	...	...	...	...	...	3	

								2nd Line.									
H.Q. of a Div. (Mxd. Bdes.)	...	...	...	18	...	...	...	6	...	...	...	21	...	...	...	7	
do. Cav. Bde.	...	6	3	...	...	...	...	3	...	6	5	...	...	...	...	4	
do. Mxd. Inf. Bde.	...	...	...	6	...	...	...	2	...	...	...	6	...	...	...	2	
do. British Inf. Bde.	...	...	...	6	...	...	...	2	...	...	...	6	...	...	...	2	
Cav. Regt. (British)	...	96	42	...	...	...	...	54	...	114	52	...	...	...	...	63	
do. do. squadron	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
do. (Indian)	...	92	41	...	...	...	...	51	...	110	50	...	...	...	...	60	
do. do. squadron	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
H.A. Battery	...	32	15	...	...	...	...	10	...	40	19	...	...	...	...	20	
H.Q. F.A. Brigade	...	...	...	3	...	...	...	1	...	...	...	3	...	...	...	1	
F.A. Battery	...	...	...	26	...	...	...	12	...	...	...	42	...	...	...	14	
M.A. Battery (British)	78	...	...	...	...	...	...	27	102	...	...	...	...	...	...	39	
Cav. Bde. Atam. Column	...	80	59	...	...	...	...	43	82	59	...	...	...	...	...	44	
Divl. Atam. Column	...	531	248	48	...	...	...	325	...	534	248	54	...	...	...	327	
H.Q. Divl. Engineers	...	...	...	3	...	...	...	1	...	...	...	3	...	...	...	1	
Field Troop R.E.	...	16	9	...	...	...	...	10	...	20	10	...	...	...	...	11	
Field Co. Sappers & Miners	...	...	...	27	...	...	...	16	...	...	...	33	...	...	...	12	
Inf. Battalion (British)	...	...	...	114	...	...	...	42	...	...	...	144	...	...	...	55	
do. (Indian)	108	...	...	...	...	...	...	42	111	...	...	...	...	...	...	43	
Field Ambulance (British)	...	...	...	56	48	1	20	48	...	...	...	63	48	1	20	50	For purposes of calculation a section may be taken to be ½ of these totals.
do. (Indian)	...	...	...	52	48	1	20	45	...	...	...	56	48	1	20	49	
Sec. Cav. Field Amb. (British)	8	16	7	...	...	...	...	14	3	18	8	...	...	...	...	15	20 ambulance riding animals in addition.
do. do. (Indian)	8	12	6	...	...	...	...	14	8	14	6	...	...	...	...	14	20 ambulance riding animals in addition.
								Totals.									
Cavalry Bde. 1st & 2nd Line Transport	537	538	270	...	...	...	...	442	537	670	314	...	...	...	...	481	60 ambulance riding animals in addition.
Cavalry Divn. 1st & 2nd Line Transport	2,077	628	284	3,601	240	5	100	2,103	2,158	644	285	3,400	240	5	100	2,580	
Mixed Infantry Bde.	461	...	...	399	...	...	...	307	471	499	...	...	...	...	...	364	
British Infantry Bde.	515	462	...	...	...	...	...	367	516	582	...	...	...	...	...	417	

NOTES.—1. On Summer Scale there will be 25 mule carts, 50 draught mules and 50 personnel less in a cavalry brigade.
2. The establishments of cavalry brigade supply column and field troop R.E. are approximate only.

39. DETAILS OF TRANSPORT VEHICLES AND STORES IN COMMON USE.

I. Transport Vehicles.

Vehicle.	Weight equipped without load.	Weight equipped with load.	Maximum load.	Width overall.	Length, shafts or pole exclusive.
	cwt. qrs. lbs.	cwt. qrs. lbs.	cwt. qrs. lbs.	ft. in.	ft. in.
Cart, S.A.A., Mk. II**	9 3 20	23 0 20	13 1 0(a)	6 4	7 6
Cart, forage, Mk. II	8 3 1	23 3 1	15 0 0	6 3	15 0(b)
Cart, Maltese, Mk. V*	7 2 0	22 2 0	15 0 0	6 1	6 5
Wagon, G.S. Mk. IX ...	17 2 5	47 2 5	30 0 0	6 2½	13 9
Wagon, G.S. " X ...	17 0 5	47 0 5	30 0 0	6 2½	13 6½
Wagon, G.S. " X* ...	17 0 7	47 0 7	30 0 0	6 4	13 6½
Wagon, Ambulance, Mk. VI	23 3 18	32 2 6 37 3 20 43 1 4	4 lying, or 2 lying and 6 sitting, or 12 sitting.	7 0½	13 9
Wagon Ambulance, light, Mk. I— With No. 159 wheels	17 1 16	29 1 22	2 lying or 8 sitting	6 3	12 6
" " 46 "	16 0 16	28 0 22			
Cart, water tank { Mk. II	9 1 7	19 3 11	gallons 118	6 1	6 10
" II*	13 0 21	23 1 3	113	6 1	6 10
Wagon, limbered, G.S.— With light wheel, No. 198A	11 2 9	31 2 9	cwt. qrs. lbs. 20 0 9	6 4	18 9
With No. 209 wheel	13 0 21	43 0 21	26 0 0	6 4	13 9
Cart, tool, R.E. { Mk. I ...	10 1 10	25 3 20	15 2 0	6 0	6 9
" II...	10 0 26	23 0 26	13 0 0	6 2½	6 9
Wagon, pontoon, Mk. V	19 0 1	47 2 1	28 2 0	6 7	17 4
Cart, cable { Mk. I ...	10 2 18	24 2 18	14 0 0	6 0	9 0
" II ...	11 3 27	35 3 27	14 0 0	6 0	9 0
Wagon, cable ...	18 1 11	32 0 11	13 3 0	6 2½	16 1
Wagon, light spring, R.E.	10 1 27	21 0 0	11 0 0	6 2½	10 7
Wagon, S.A.A., and limber, Mk. I* ...	16 0 4	31 1 4	15 1 0	6 2½	13 0
Wagon, limbered, telephone	13 2 0	17 0 0	3 2 0	6 4	14 2
	Special for India.				
Transport cart ...	5½ cwt.	13 cwt.	...	...	...
Pontoon wagon ...	30 "	50 "	...	...	...
Ambulance traps ...	11 "	...	...	...	...
Dandy	30 lbs.	...	...	...	...

(a) Or 16 boxes S.A. ammunition. (b) With shafts.

Note.—The track of all military vehicles, except a pontoon wagon and Mk. VI ambulance wagon, may be taken as 5' 2". That of a pontoon wagon is 5' 10".

ii. Load of a G.S. Wagon.

A G.S. wagon can carry any one of the following loads:—400 blankets, 300 felling axes, 600 hand axes, 290 picks, 720 billhooks, 200 kettles (camp), 600 picketing pegs, 240 large horse rugs, 260 small horse rugs, 640 G.S. spades, 350 R.E. spades, 28 circular tents (single), 20 circular tents (double), 4 hospital marquees, 1,800 ropes, picketing (4' 9"), 40 boxes S.A.A. (chargers) 1,000 rounds each, or 45 boxes S.A.A. (chargers) 840 rounds each, 600 sheets, ground, in cases, 900 loose, 8 Boyer's stoves.

Reduce above by ⅓ for distances of over 15 miles.

The following are the approximate loads of G.S. wagons, with various natures of ammunition:—

Q.F. 13 pr.	144	rounds per wagon.
Q.F. 18 pr.	108	" " "
Q.F. 4·5" howitzer	66	" " "
B.L. 5" howitzer	46	" " "
B.L. 60 pr.	40	" " "

iii. The following loads should not as a rule be exceeded.

—	No. of horses.	Slow moving units.	Rapid moving units—i.e., Cav., M.I., R.H.A., Field Troop, R.E.
Forage cart ...	1	1,200 lb.	—
" " ...	2	1,500 lb.	1,200 lb.
G.S. wagon ...	4	3,000 lb.	2,700 lb.
" " ...	6	—	3,000 lb.

iv. Other Loads.

Description.	Load.	Notes.
S. African ox-wagon ...	5,000 lb.	
S. African mule wagon ...	2,000 to 3,000 lb.	
Scotch cart, S. Africa ...	1,700 to 2,000 lb.	
Small carts	400 lb.	
Pack animals—		
Mules and ponies... ...	160 lb.	
Pack-horses	200 "	
Camels	320 to 400 lb.	
Bullocks	200 lb.	
Men	50 "	
Donkeys	100 "	
In India authorized loads—		
Pack-mules and ponies ...	2 maunds	
Camels	5 "	Supplies for 1 Division for 1 day in India (exclusive of hay or bhoosa for animals)=1,600 maunds.
Mule carts	10 "	
Bullock carts	10 to 12 maunds	
Pack-bullocks	2 maunds	
Donkeys	1½ "	
Coolie	2 "	

A maund = about 80 lb. (see page 257.)

v. Packing and Weight of Ammunition

Article	How Packed.	Size in Inches. width.	depth.	length.	Weight.
Ammunition—					
13-pr. Q.F.	Box (M. I) of 4 rounds ...	9·7	9·7	24·2	91lbs.
	,, (M. II)	9·5	9·75	26·25	89lbs. 12oz.
18-pr. Q.F.	Box (M. I) of 4 rounds ...	10·45	10·4	26·3	116lbs.
	,, (M. II)	10·375	10·375	27·625	117lbs. 8oz.
4·6" Howr.	Box (M. I) of 2 rounds (shrapnel)	19·625	13·125	7·5	95lbs. 14oz.
	,, (M. II)	17·625	14·812	7·5	97lbs. 13oz.
	,, (M. I)... (lyddite)	19·625	17·25	6·75	98lbs. 8½oz.
5" Howr. ...	120 cartridges in case M.L. whole	17	21·625	17·625	136lbs.
	2 shells in box projectile	22·81	12·95	7·875	119lbs.
60-pr. ...	12 cartridges in case M.L. whole	17	21·625	17·625	153lbs.
	1 shell in sling	,,	,,	,,	62lbs. 3oz.
·303 ...	Box of 1,000 rounds ...	8·312	10·85	17	80lbs. 8oz.
M. VII	20 bandoliers of 50 rounds in chargers in box	,,	,,	,,	75lbs.
(India)	Box of 1,120 rounds ...	,,	,,	,,	93lbs 10oz.
Pistol ...	276 rounds in 23 bundles of 12 rounds each in box	6·5	4·625	8·625	16lbs. 8oz.
(India)	Box of 276 rounds ...	,,	,,	,,	17lbs. 4oz.

vi. Weights of a few Common Articles.

Articles.	Weight. lb.	oz.	Remarks.
Armourers' bag	8	14	
Binoculars (in case)	1	14	
Blanket, for man	4	8	
Butcher's Implements, in case	37	0	
Camp kettle (12 qts.)... ...	8	8	
Farriers' Tools	14	6½	
Food—			
Day's ration for man ...	4	0	Includes small amount of fuel.
Emergency food ...	0	9½	
Corn ration for horse ...	12	0	
Case preserved meat ...	70-75	0	Contains 60 rations.
Case biscuit	70-75	0	,, 50 ,,
Pale patent forage ...	82	0	,, 4 ,, (including hay ration).
Grocery pannier	38	0	
Mekometers (complete sets)	6	7	
Bag, horse { large	8	8	
Bag, horse { small	7	0	
Saddles, pack, complete ...	65	0	
Saddles, universal, complete	29	4	
Shoemakers' tools	25	0	
Signalling Equipment—			
Message cases with forms and manuals	2	14	
Small blue or white flags	0	6½	
Heliographs, 5"	3	4	
Stands, lamp or heliograph	4	13	
Prismatic compass in case	0	8	
Watch	0	4	

vii. Weights of a few Common Articles—*continued.*

Articles.	Weight.	Remarks.
	lbs.	
Stationery box, filled ...	56 0	
Stretcher	18 0 *	
Telescopes—		
Signalling and reconnaissance	3 2	
Signalling and reconnaissance (with stand) ...	8 15	
Field Artillery	5 0	
" " (with stand)	7 0	
Tools— (See page 86).	Approximate weight.	
Artificers' Tools—		
Cavalry Regiment ... } Mounted Infantry Bn. }	lbs. 140	
Horse or Field Artillery Brigade—		
Brigade Head Quarters	279	
Battery (each)	235	
Ammunition Column ...	435	
Field Troop, R.E. ...	434	
Field Company, R.E. ...	1,582½	
Infantry Battalion ...	98⅙	
Army Service Corps Cos.—		
Wheelers	195	
Saddlers	13½	
Smiths and Farriers ...	140	
Cavalry Field Ambulance	677	
Field Ambulance	88⅔	
	lb. oz.	
Wallet, veterinary	7 3½	
Wire-cutter (in frog) ...	1 3½	
	INDIA. *	
Blanket stretcher	14 lbs.	
Field stretcher	34 "	
Patch-il (metal)	21 "	
Pakhal (filled with 6½ galls.)	100 "	
Yakdan 1 pair	* 38 "	

viii. How a few Common Military Articles are Pack-d, with the Size of the Package.

Article.	How packed.	Size in Inches.
Belts, woollen	Bales of 300	27 × 16 × 24
Blankets	Bales of 25	18 × 21 × 32
Boots	Cases of 45 to 50 pairs	34 × 21 × 14½ / 30 × 22½ × 16½
Braces	Cases of 500	33 × 32 × 15
Greatcoats (dismounted)...	Bales of 25	29 × 20 × 29
Dressings, field	Cases of 500	30½ × 19½ × 15½
Helmets	Cases of 20	30 × 23½ × 17
Kettles, camp	Cradles of 5	30 × 14 × 14
Puttees	Bales of 200 pairs ...	29 × 20 × 24
Service Dress—		
Jackets	Bales of 50	30 × 21 × 22
Trousers	Bales of 50	25 × 14 × 26
Sheets, ground	Cases of 60	26 × 22 × 19
Shirts, flannel	Bales of 100	25 × 20 × 24
Socks, worsted	Bales of 300 pairs ...	29 × 16 × 26
Towels	Bales of 200	25 × 21 × 25

40. MECHANICAL TRANSPORT.

Description.	Overall Measurements. Length.	Overall Measurements. Width.	Weight. (N.B.—For Engine and Lorries the weight includes fuel and water.)	Composition of Train.	Net useful Load.	Average Speed loaded (a).	Minimum Driver Personnel (b).	General Remarks re Fuel, Water, etc.
Traction Engines...	15' 6" to 19'	6' to 8' 6"	12 to 16 tons	3 or 4 trucks	12 to 18 tons	8 miles per hour	3	The coal consumption for traction engines per gross ton mile is approximately 1·5 lbs., and for small tractors and steam lorries it is 2 lbs. Traction engines require to refill their water tanks every 10 to 12 miles. Light tractors and steam lorries every 15 to 20 miles. Internal-combustion-engined lorries can usually travel 50 to 100 miles without refilling their fuel tanks, &c.
Light Tractors ...	13' 6" to 14' 6"	5' 6" to 6'	5 tons 10 cwt. to 7 tons	1 or 2 trucks or 3 trailers	4 to 6 tons	4 miles per hour	2	
Internal-combustion Tractor ...	10' 6"	6' 8"	6 tons 10 cwt.	1 or 2 trucks or 3 trailers	4 to 6 tons.	5 miles per hour	2	
Steam Lorries (c)	20' to 22'	6' 6" to 7' 6"	5 tons to 6 tons 10 cwt.	1 trailer	3 to 5 tons	5 miles per hour	2	
Internal-combustion - engined Lorries (d)	18' to 23'	5' 6" to 7' 6"	2 tons 10 cwt. to 4 tons	—	2 to 5 tons	7 to 10 miles per hour	2	
Motor Omnibus ...	19' to 23'	6' 6" to 7' 6"	3 to 4 tons	—	20 to 30 persons (g)	8 to 12 miles per hour	2	

Motor Cars... ...	10' to 15'	5' 6" to 6' 6"	15 cwt. to 1 ton 10 cwt.	—	2 to 5 persons (g)	15 to 20 miles per hour	1
Trucks	13' (f) to 15'	6' 6" to 7' 6"	1 ton 15 cwt. to 2 tons 15 cwt.	—	4 to 6 tons	—	—
Trailers (e)	13' to 14'	6' 4" to 7'	17 cwt. to 1 ton.	—	1½ to 2 tons	—	—
Water Tanks ...	11' to 12'	6' to 7'	1½ tons to 3 tons	—	300 to 450 galls.	—	—
Travelling Vans ...	11' to 17'	7' to 8'	1 to 2½ tons	—	—	—	—

The average road spaces occupied by mechanical transport vehicles are given on p. 30.

Five small tractors with trains or 5 steam lorries with trailers are approximately the equivalent of 2 traction engines with the necessary trucks.

(a) The speeds are based on those which the ordinary motor vehicles in commercial use may be expected to perform under military conditions, when marching apart from other troops.
(b) Whenever mechanical transport is employed, arrangements must be made to have efficient artificers with the necessary tools to execute all repairs and adjustments required at the end of each day's work.
(c) When using a trailer 1½ to 2 tons additional can be drawn in it.
(d) It is not considered economical to utilise lorries with less than 30 cwt. carrying capacity for transport purposes.
(e) General Service wagons, fitted with drawbars, can be used as trailers.
(f) This does not include the drawbar, which is about 3' to 4' long, and can be easily detached.
(g) With rifles and equipment.

41. CONVOYS.

I. Command.

1. The senior combatant officer with a convoy will command both the transport and its escort. He will consult the senior transport officer on all matters which affect the welfare and convenience of the transport, will avoid all interference with his technical functions, and will give effect to his wishes unless, by so doing, the safety of the convoy would be endangered.

II. System of Convoys.

1. Convoys may be worked on any of the three following systems:—

(a) Through convoys.
(b) Staging.
(c) Meeting.

2. The through convoy system consists in the same animals and vehicles being employed from the start of the convoy until its arrival at its destination.

3. The staging system consists in the division of the road into stages, the same section of the transport working over the same ground, proceeding laden and returning empty.

4. The meeting system is that by which two sections, one laden and the other unladen, meet daily at a fixed point between two stages, when loads are transferred or vehicles exchanged, each section returning to its respective stage. (In this case it must be remembered that, to transfer loads, labour is required, and, to exchange vehicles, animals, harness, &c., must be similar.)

5. The through convoy system is generally adopted in front of the advanced depot, and the staging or meeting systems on the lines of communication.

III. Short Rules for Convoys on the March.

1. Do not load till necessary.
2. Keep strict march discipline, no straggling or opening out.
3. Pace of a column is the pace of the slowest animal, so they must lead.
4. If possible, do not put animals of different paces (e.g., mules and camels) in the same convoy.
5. With pack animals each driver must lead his own animals (usually three). Long strings are prohibited.
6. No one but the driver to ride on a vehicle.
7. Keep some spare animals and vehicles in rear of the column.
8. Remove breakdowns from the roadway.
9. Do not make long halts unless animals can be outspanned and packs removed, but take advantage of every facility for watering.
10. Halt on the far side of a defile or obstacle.
11. Do not trot to make up lost ground.
12. When paths are narrow, certain sections of the path must be kept for certain definite hours for convoys moving in a given direction.
13. If attacked, a convoy should not be halted or parked except as a last resource. If the whole or part of a convoy is in danger of falling into the enemy's hands it should be destroyed or made unserviceable.
14. In danger leave space (5s) between wagons and line occupied by troops.
15. Cooking places and latrines outside danger; no fires near wagons.

42. TRANSPORT BY RAIL.

i. Rules.

1. Interfere as little as possible with the railway management.
2. Trucks and carriages must not be kept loaded up.
3. Traffic should not be suspended except for very good reasons.
4. No off loading on the main line.
5. No alteration once the time table is settled. But if done unavoidably, an order in writing must be given to the Railway Staff.
6. Troops must not occupy railway buildings or use the water supply without authority from a railway control officer.
7. Arrange rest camps near the station with their own water supply.
8. Troops should never take tarpaulins, coal, wood, or other railway material.
9. Provide a liberal allowance of sidings if a concentration is anticipated.

ii. *Entraining*

1. Send an officer ahead to ascertain facilities for entraining.
2. Tell off parties to entrain horses, guns and wagons.
3. Entrain baggage, horses, guns and wagons simultaneously before troops arrive, if possible.
4. Detail men in charge of trucks containing horses or vehicles.
5. Pack guns, fully equipped, and wagons, loaded compactly and fasten securely to trucks. Occupy spare space with gear, kits, etc. Pontoon wagons may require an empty truck between every second truck.
5. Entrain horses, saddled or harnessed for journeys under 5 hours. Put sand or ashes on the floors to prevent slipping. Entrain quiet horses first. The closer horses are packed, the quieter they travel. Their heads should be left free and should face away from the other lines of rail.
7. Guns or vehicles should be in the same trains as their teams, and horses as the men who ride or drive them.
8. Tell off the train and the men.
9. To prevent delay at places where horses are to be watered and fed, water should be kept ready for them in buckets before their arrival, and nosebags filled en route.
10. Inflammable stores should be at the end of a train, and risk of fire should be guarded against if in open trucks.

*Time required to entrain ½ Bn. Infantry with Regimental Transport about 45 minutes.

*Time for a Squadron Cavalry, about 40 minutes; and for ½ Battery Artillery, about 1 hour.

Average speed of troop trains from 15 to 20 miles per hour on narrow, 20 to 25 miles on broad gauge lines.

iii. *Detraining.*

1. Ascertain arrangements for detraining and moving off before troops leave carriages.
2. See to ramps for unloading; material for emergency ramps should be kept handy.
3. Clear station and approaches as soon as possible.
4. Riding horses to be led at once to the place of assembly, draught horses being taken to their vehicles, which are then taken to the place of assembly.

* These times are dependent on platform space being available.

IV. ROLLING STOCK CAPACITY FOR TROOP MOVEMENTS.

1. The following tables are based on the following data, which are the average figures for British rolling stock:—

6 officers to each compartment.
8 men to each compartment.
7 horses, unharnessed or unsaddled, to each cattle truck, except heavy draught, which are allowed 1 truck to every 6 horses.
3 staff officers' chargers to each horse-box.
1 four-wheeled vehicle, or 1 gun and limber, to each open truck, except 60-pr. guns and limbers, which are allowed 2 trucks; and pontoons, which are allowed 3 trucks to 2 pontoons.
2 two-wheel vehicles to each open truck.

2. Should it be necessary to put men in trucks, allow 5½ square feet to each man, but for journeys over 8 hours duration 7 square feet per man should usually be allowed.

3. To reduce, as far as possible, the number of different train compositions, the composition required for a given train load is used without modification for a slightly smaller train load, and the accommodation allowed does not therefore agree in all cases with the above figures.

4. These train loads may be considered normal for broad gauge railways in war. But the loads are, generally speaking, heavy, and though most of the railways in the United Kingdom could deal with them, it might be necessary, even in this country, to run some of the heavier loads in two portions over sections of lines where gradients are severe or on lines whose engines are light.

5. The numbers, as regards Home, are based on War Establishments for 1910-11, and do not include details left at the base or first reinforcements. When journeys exceed 8 hours, or when rolling stock is not scarce, only 75 per cent. of the numbers of personnel given below should be allotted to each compartment. Horses are allowed 7' 2": width saddled 2' 6", unsaddled or unharnessed 2' 3". If time permits, and the movement of troops is to continue over a long period on long journeys abroad, covered trucks can be fitted with the required ventilation, and with removable planks resting on wood chocks, which form an upper tier of sleeping berths. The compartments of passenger coaches can be similarly fitted. This may be necessary in climates where the men travel in open trucks, or hammocks may be slung. In passenger coaches on British railways, men will not be able to sleep with the accommodation allowed below. With 5 men to a compartment they can take it in turn to sleep three at a time. The number of compartments in a coach varies from 5 to 8.

V.—Composition of Trains for Army Units.

	A.	B.	C.	D.	E.	F.	G.	H.	K.	L.	M.	N.	O.	P.	Q.	R.	S.	T.	U.	V.	W.	X.	Y.
Compartments	14	18	21	13	26	12	15	9	13	9	16	21	12	16	16	28	18	9	10	12	15	8	17
Horse Boxes	9	9	6	5	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Cattle Trucks	6	6	11	18	6	15	13	12	12	10	13	25	12	11	7	11	17	6	8	9	12	11	10
Vehicle Trucks	8	7	9	7	7	14	11	11	9	19	17	4	6	14	10	10	16	6	10	10	12	17	15
Brake Vans	2	2	1	2	1	1	2	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1
Totals...	28	27	31	30	25	32	29	26	25	32	34	35	21	29	21	27	37	15	21	22	28	31	29

Note.—Composition "N" for { 1 Company Mounted Infantry. / 1 Squadron Cavalry. } and Composition "S" for 1 Wireless Telegraph Company will run in two portions if over load.

vi. Trains for 1 Cavalry Division.

Army Unit.	Train load.	No. of Trains.	Composition.	Extra vehicles to be attached.
Headquarters of Division (less Motor-cars)		1	A.	
4 Cavalry Brigades (12 Cavalry Regiments.)	Hd. Qrs. of a Brigade, Hd. Qrs. of a Regt., and Machine Gun Section	4	D.	
	Hd Qrs. of a Regiment and Machine Gun Section	8	O.	
	Squadron of Cavalry.	36	N.	
Divisional Artillery	Divn. Hd. Qrs. and Hd. Qrs. of two Brigades ...	1	D.	
3 Horse Artillery Brigades	Half Battery ...	3	G.	4 Cattle trucks.
	One-third Ammn. Column	6	F.	1 Vehicle truck.
Divisional Engrs. ...	Divn. Hd. Qrs. and 1 Field Troop* ...	1	O.	3 Compartments 1 Cattle truck. 1 Vehicle do.
4 Field Troops ...	1 Field Troop ...	3	O.	
1 Wireless Tel. Co.	1 Wireless Tel. Co.	1	S.	
4 *Cavalry Field Ambulances* ...	1 Cavalry Field Ambulance ...	4	P.	
	Total Trains ... (exclusive of A.S.C.	73		

vii Trains for 1 Infantry Division.

Army Unit.	Train Load.	No. of Trains.	Composition.	Extra vehicles to be attached.
Headquarters of the Division		1	B.	
Headquarters of Divisional Engineers, and Headquarters of 3 Infantry Brigades.	Four Headquarters ...	1 1	C.	
12 *Infantry Bns.* ...	Half battalion Infantry	24	E.	
Divisional Artillery :—				
Divisional Headquarters ... 3 F.A. Brigade Headquarters	4 Hd. Qrs.	1	A.	6 Compartments. 1 Horse box. 6 Cattle trucks. 4 Vehicle Trucks.
9 Batteries and 3 Ammunition Columns R.F.A....	½ Battery	18	G.	
	½ Amm. Col. ...	12	F.	
1 *Field Artillery Howr. Brigade.*	Brigade Hd. Qrs. and ½ Battery ...	1	G.	3 Compartments. 2 Horse boxes. 2 Cattle trucks.
3 Batteries and Ammunition Col.	Half Battery ... Half Ammunition Col.	3 2	G. H.	
1 *Heavy Battery & Ammunition Col.*	Half Battery ... Ammunition Column	2 1	K. H.	2 Vehicle trucks. 1 Vehicle truck.
Divisional Ammunition Column.	Hd. Qrs. and one-third of No. 1 Section	1	F.	
	One-third of No. 1 Section	2	F.	
	One-third of Section (Nos. 2 and 3 Sections) ...	6	F.	
	One-third of No. 4 Section	3	F.	
Divisional Engrs.— 2 Field Companies	1 Field Company ...	2	R.	
Divisional Tel. Co.	1 Company	1	T.	
2 *Companies of Mounted Infantry*	1 Company	2	N.	
1 *Field Ambulance*	Half Field Ambulance	2	Q.	
	Total Trains ... (exclusive of A.S.C.)	87		

viii. Trains for Army Troops.

Unit.	Train Load.	No. of Train.	Composition.	Extra vehicles to be attached.
Horse Artillery ... Battery and Mounted Brigade Ammunition Col.	Half Battery ...	2	G.	5 Cattle trucks.
	Half Ammunition Column	2	H.	
Royal Engineers:—				
Signal Company (Cable) ...	Half Company ...	2	V.	
Signal Company (Air Line) ...	Half Company ...	2	W.	
Balloon Company	One Company ...	1	U.	
Bridging Train ...	One-fourth Bridging Train ...	4	H.	1 Vehicle truck.
Mounted Infantry Battalion.	Headquarters	1	L.	
	Machine Gun Section and Battalion transport	3	N.	
	One M.I. Company			

ix. Trains for a Territorial Force Division.

Unit.	Train Load.	No. of Trains.	Composition.	Vehicles to be added.
Headquarters of Division	... ...	1	A.	
3 Infantry Brigades	Bde. Hd. Qrs., and half Batt. of Infantry	3	E.	4 Compartments. 2 Horse boxes. 2 Cattle trucks.
	Half Batt. of Infy.	21	E.	
Divisional Artillery Headquarters and 3 Field Artillery Brigades	Div. Hd. Qrs., and Half Bty.... ...	1	K.	3 Horse boxes.
	Bde. Hd. Qrs., and Half Bty.... ...	3	K.	8 Compartments. 1 Cattle truck.
	Half Battery ...	14	K.	
Field Artillery (Howr.) Brigade	Half Ammn. Column	6	H.	2 Compartments. 4 Vehicle trucks.
	Hd. Qrs., and Half Bty.	1	K.	
	¾ Battery	2	G.	
	Ammunition Column	1	F.	2 Vehicle trucks.
Heavy Artillery, Battery and Ammn. Column	¾ Battery	1	Y.	2 Cattle trucks.
	¼ Bty. and Ammn. Column	1	W.	1 Vehicle truck.

TRAINS FOR A TERRITORIAL FORCE DIVISION—*continued.*

Unit.	Train Load.	No. of Trains.	Composition.	Vehicles to be added.
Divisional Engrs. 2 Field Companies, 1 Telegraph Coy.	Hd. Qrs., & 1 Field Coy.	2	R.	2 Compartments. 2 Cattle trucks. 2 Vehicle trucks.
	1 Field Company ...	1	R.	
	1 Telegraph Company	1	T.	
1 Yeomanry Regt.	Hd. Qrs. & Machine Gun Section ...	1	T.	8 Vehicle trucks.
	1 Yeomanry Squadron...	3	N.	*Less* 5 Cattle trucks and 8 Vehicle trucks.
Divisional Transport & Supply Column	½ Transport and Supply Column...	4	X.	4 Compartments.
3 Field Ambulances	1 Field Ambulance	3	L.	21 Compartments.
	Total Trains ...	69		

x. INDIA.

1. The following tables give the composition of troop and transport trains required for each unit on field service scale on a 5′ 6″ gauge line.

2. These tables are based on units of 4 wheelers and lay down the description of rolling stock which will normally be supplied. If bogie stock is provided the total length of the train must not exceed 1,300 feet and total gross load must not exceed 800 tons. The data for calculating the net load are:—

5 Officers = ...	1 ton.
10 Men = ...	1 ton.
Artillery Horses = ...	1,000 lbs.
British Cavalry Horses = ...	900 "
Indian Cavalry Horses = ...	750 "
Ordnance Mules = ...	750 "
Transport Mules = ...	600 "
Camels = ...	1,230 "
Bullocks = ...	950 "
In brakes = ...	2 tons.

3. The capacity of rolling stock on 5′ 6″ gauge is as follows:—

1st Class Carriage	8 passengers.*
2nd Class Carriage	9 " †
3rd Class Compartment	6 fighting men. 10 followers.
3rd Class Carriage (4-wheeler) = ...	6 compartments.
Wagons, horse or cattle ...	8 troop horses or 8 ordnance Mules or 10 transport Mules or 6 Camels or 8 S. T. Bullocks or 10 A. T. Bullocks or 21 donkeys. With two attendants, line gear, grain and fodder for two days.

* British officers only should be given 1st class accommodation.

† Indian Officers, British Warrant Officers, and Staff Serjeants only are entitled to 2nd class accommodation, but available accommodation in 2nd class compartments should be filled up by other British ranks or clerks or S. and T. agents.

Open truck (net load 8 tons)	1 G. S. wagon, or 4 pairs of wheels for artillery carriages. 20 A. T. carts dismantled.
Wagons, covered goods	10 tons or 20 A. T. carts.
Powder van	5 tons.

4. In the event of accommodation existing in any wagons containing guns, store carts, etc., the officer in charge of the train may, at his discretion, fill up all such available accommodation with followers, so allowing more room in carriages for fighting men. Reserve forage, baggage, stores, etc., should also be placed in these wagons; any superfluous vehicles being dispensed with.

5. Bearers of any Bearer Corps have not been provided for, if these move with the unit special arrangements will be made at the time.

6. The average train on metre gauge lines, with normal gradients, may be taken as 40 vehicles, including brakes.

On narrow gauge lines with normal gradients, 20 vehicles.

xi. TABLE SHOWING ACCOMMODATION REQUIRED FOR UNITS AT WAR STRENGTH ON INDIAN BROAD GAUGE RAILWAYS.

Unit.	First Class.	Composite, 1st and 2nd Class.	Second Class.	Third Class.	Wagons (covered goods).	Open trucks.	Wagons (horse or cattle).	Horse-boxes.	Brakes.	TOTAL.
1	2	3	4	5	6	7	8	9	10	11
Battery, Royal Horse Artillery—										
1 Train	...	1	...	4	2	11	23	2	2	45
Cavalry Brigade Ammunition Column—										
Royal Horse Artillery Section	...	1	...	2	...	9	12	1	2	27
Battery, Royal Field Artillery—										
1 Train	...	1	...	4	2	11	21	2	2	43
Divisional Ammunition Column—										
Royal Field Artillery Section—										
Train A.	...	1	...	2	2	17	20	1	2	45
Train B.	...	1	...	2	1	17	21	1	2	45
Battery, Royal Field Artillery (Howitzer)—										
1 Train	...	2	...	5	2	10	19	2	2	42
Howitzer Brigade Ammunition Column—										
Train A.	...	1	...	2	1	10	21	2	2	45
Train B.	...	1	...	2	1	6	6	...	2	18
Mountain Battery (British)—										
1 Train	...	2	...	8	5	...	24	1	2	42
Mountain Battery (Indian)—										
1 Train	...	2	...	8	5	...	24	1	2	42

TABLE SHOWING ACCOMMODATION REQUIRED FOR UNITS AT WAR STRENGTH ON INDIAN BROAD GAUGE RAILWAYS—*continued.*

Unit.	1st Class.	Composite, 1st and 2nd Class.	Second Class.	Third Class.	Wagons (covered goods).	Open trucks.	Wagons (horse or cattle).	Horse-boxes (double).	Wagons (camel loading).	Powder vans.	Brakes.	Total.
1	2	3	4	5	6	7	8	9	10	11	12	13
Heavy Battery (30-pr. or 4") and its Ammunition Column—												
1 Train	...	2	...	5	8	9	22	2	...	...	2	45
Heavy Battery (5") and its Ammunition Column—												
Train A.	...	1	...	4	1	9	26	1	...	...	2	44
Train B.	...	1	...	2	1	2	1	1	...	...	2	10
British Cavalry Regiment—												
Train A.	2	...	1	5	2	...	29	4	...	...	2	45
Train B.	1	1	...	6	2	...	29	4	...	...	2	45
Indian (Silladar) Cavalry Regiment—												
Trains A. & B.	...	1	...	5	2	...	29	1	...	...	2	40
Train C.	...	1	...	4	2	...	21	2	...	...	2	32
Battalion, British Infantry—												
1 Train	3	1	...	36	2	...	2	3	...	...	2	38
Battalion, Indian Infantry—												
1 Train	1	2	1	22	3	...	2	3	...	...	2	36
Battalion, Indian Infantry (Pioneers)—												
1 Train	1	2	1	22	3	...	4	3	...	...	2	38
Field Company, of Sappers and Miners	...	1	...	6	2	...	2	2	...	...	2	15
Railway Company Sappers and Miners	...	1	1	6	5	...	...	1	...	...	2	16
Pontoon Section—												
1 Train	...	1	...	2	...	38	...	1	...	...	2	44
Transport Units.												
Cavalry Brigade Mule Corps—												
Trains A. and B. ...	...	1*	‡1	2	2	5	30	...	...	...	2	42
Train C.	...	...	1	2	2	5	29	...	...	...	2	41
Pack Mule Corps (without carts)—												
Trains A. and B. ...	...	1‡	...	2	1	...	39	1§	...	...	2	45

* Train A. only.
‡ Train A. only.
† Train B. only.
§ Train B. only.

TABLE SHOWING ACCOMMODATION REQUIRED FOR UNITS AT WAR STRENGTH ON INDIAN BROAD GAUGE RAILWAYS—*continued.*

Unit.	First Class.	Composite, 1st and 2nd Class.	Second Class.	Third Class.	Wagons (covered goods).	Wagons (open low-sided).	Wagons (horse or cattle).	Horse-boxes (double).	Powder vans.	Brakes.	TOTAL.
1	2	3	4	5	6	7	8	9	10	11	12
Pony Cart Train—											
Trains A. and B. ...	...	...	...	3	1	1	37	...	...	2	44
Train C.	...	1	...	3	1	1	36	...	...	2	44
Army Transport or Siege Train Bullocks—											
One Half Troop	...	...	...	1	...	...	6	...	...	...	7
Two Half Troops ...	...	...	...	1	...	...	12	...	...	1	14
Three Half Troops ...	...	...	...	2	...	...	18	...	...	1	21
Four Half Troops ...	...	...	...	1	1	...	24	...	...	1	27
Bullock Train (hired)—											
Train A.	...	...	...	3	2	...	37	...	...	2	44
Train B.	...	...	...	4	2	...	37	...	...	2	45
Train C.	...	1	...	3	1	...	38	...	...	2	45
Camel Corps—											
Trains A. B. and C. ...	...	...	...	1	1	...	41	...	...	2	45
Train D.	...	1	...	1	...	...	40	1	...	2	45
Other Units.											
Engineer Field Park ...	...	1	...	1	7	...	...	1	...	...	10
British Field ambulance—											
Whole ambulance ...	...	1	...	4	2	...	1	1	...	...	9
Three Sections	...	1	...	3	2	...	1	1	...	...	8
Two Sections	...	1	...	2	2	...	1	...	...	...	6
One Section	...	1	...	2	1	...	...	1	...	...	5
Indian Field ambulance—											
Whole ambulance ...	...	1	...	4	2	...	1	1	...	...	9
Three Sections	...	1	...	3	2	...	1	1	...	...	8
Two Sections	...	1	...	2	2	...	1	...	...	...	6
One Section	...	1	...	1	1	...	...	1	...	...	4
British General Hospital, 50 beds—											
1 Train	3	1	2	6	21	...	...	...	...	2	35
Indian General Hospital ...	1	1	1	5	13	...	...	...	...	2	23
Field Veterinary Hospital—											
Whole Hospital	...	1	...	1	1	...	1	1	...	...	5
Half Hospital	...	1	...	1	...	...	...	1	...	...	3
Veterinary Store Depot ...	...	1	...	1	1	...	...	1	...	...	4

xii. *Entraining.*

Train load.	Minimum time required.		Normal time allowed on concentration.		Remarks.
	Entraining.	Detraining and clearing platform.	Entraining.	Detraining and clearing platform.	
Battery, R. H. A. ...	40′	30′	1—30′	1—0	
Battery, R. F. A. ...	40′	30′	1—30′	1—0	
Ammunition Column, R. F. A.*	1—15′	50′	2—0	1—30′	With end loading dock.
Ditto	1—35′	1—0	2—0	1—30′	With side loading dock.
M. R. R. G. A.	25′	35′	1—0	1—0	
Heavy Battery 6″	1—30′	1—30′	2—0	1—30′	A fatigue party of 35 men per train load is required in addition to establishment.
Regiment, British Cavalry	1—10′	1—0	2—0	1—30′	
Regiment, Indian Cavalry	1—10′	1—0	2—0	1—30′	
Battalion, British Infantry.	35′	40′	1—30′	1—30′	
Battalion, Indian Infantry	25′	30′	1—0	1—0	
Battalion, Pioneers ...	25′	30′	1—0	1—0	
Mule Corps	1—15′	1—10′	2—0	2—0	
Camel train	2—0	1—40′	3—0	2—30′	

NOTES.—1. Platforms are only necessary for wagons with animals. Each 4-wheeler requires 28′ of platform. Side-loading platforms for entrainment of animals should be 3′ 9″ in height above rail, but lower platforms can be used when necessary.

2. If successive trains run at 2 hours interval, all trains receive ample time for loading and unloading except camel trains which should run at 3 hours interval per platform.

3. Open stock is not desirable for camels, or necessary for carts, A.T. Large riding camels, however, may require open stock. Carts, A.T. are taken to pieces for packing.

4. In marshalling a train all the vacuum brake stock should be placed next to the engine. If the train has to reverse en route the vacuum brake stock should be at either end, and the non-braked stock in the centre, and there should be a brake van at either end. If such a train is hauled by two engines they should be coupled tender to tender, when it will be necessary to turn them when the train reverses.

5. An engine can, without pressing it, work 70 miles a day for a short rush of traffic and 60 for a long period. Extra engines should be allowed for at the rate of ¼ for washing out, and ¼ for repairs. A engine's run is from 80 to 100 miles for slow trains and water should be available about every 30 miles. A safe allowance for water is 1,500 gallons per broad gauge engine, 800 per metre gauge, and 600 per narrow gauge. 30 minutes should be allowed at engine changing stations to allow of the train examining staff doing their work. 7 minutes is necessary to water one engine and 10 minutes for two.

1. To ascertain the time required for massing an army in a given locality, reckoning from the arrival of the first troop train:—

Divide the total number of troop trains necessary for the transport of a given force by the number of trains that can be run each day on the line or lines by which the force is to be despatched. The number of trains which can be run is usually limited by the capacities of the entraining and detraining stations.

2. The approximate length of each train, excluding engine and brake van, for the following units, is:—

½ Battery R.H.A.	228 Yards.
½ Battery R.F.A.	200 "
A Cavalry Squadron	236 "
½ Infantry Battalion	228 "
A Field Company, R.E.	246 "

3. The above must be taken as approximate only, as the stock of the different companies varies. They are based on the following measurements, from which the lengths of trains for other units can be calculated:—

Passenger coaches	41′ over buffers.
Cattle trucks	24′ " "
Open trucks	21′ " "

xiii. Tractive Power of Locomotives.

1. An approximately correct rule to carry in the head is: two-ninths of weight on drivers in lbs. divided by 29 gives gross tonnage, including engine and tender, up 1-per cent. grade under favourable conditions; for every increase or decrease of ·2 to the grade, add or substract 4½ to or from the denominator in the above calculation.

2. The starting resistance is equivalent to a grade of 0·7, and therefore an engine cannot theoretically start on the level a greater load than it could draw up a 0·7 grade at 10 miles per hour, but practically loose couplings, springs, &c., enable it to start larger loads.

3. If 100 be taken to represent the gross train load which a locomotive can start on the level (or haul up a 0·7 grade at 10 miles per hour), then the table below gives the percentage of that load which can be hauled up various grades at 10 miles per hour:—

Gradient feet per 100 feet.	Percentage of load.
0·7	100
0·8	91·6
1·0	77·5
1·2	67·0
1·4	59·1
1·6	52·8
1·8	47·8
2·0	43·6

4. The average weight in England of passenger engines is 35 tons, of goods engines 55 tons.

xiv. Gauges.

	ft.	in.
Great Britain, France, Gemany, Holland, Belgium, Denmark, Austria-Hungary, Italy, Switzerland, Sweden, Turkey, Egypt,* Canada, U.S.A.	4	8½
Russia	5	0

* Also 3 ft. 6 in.

GAUGES—*continued.*

	ft.	in.
Ireland	5	3
Ceylon	5	6
Japan	3	6
Australia, N.S. Wales ... ... 3 ft. 6 in. and	4	8½
" Victoria and S. Australia	5	3
" Queensland and W. Australia	3	6
New Zealand	3	6
Spain and Portugal	5	6
Asiatic Turkey ... ... 4 ft. 8½ ins. and	3	5½
India ... ... 1 metre and	5	6
S. Africa	3	6
Width of roadway required for single line (4' 8½' gauge)	12	0
" " " double "	23	0

XV. AMERICAN OR CANADIAN ROLLING STOCK.

Passenger car carries	50 men.
Horse car carries	16 horses unsaddled, or 12 " saddled.
Stock car carries	18 " unsaddled.
30-ton freight box car carries	30 men.
Flat cars	2 guns with limbers.

XVI. RUSSIAN ROLLING STOCK.

Wagon, ordinary, carries	48 men or 8 horses.

XVII. SOUTH AFRICAN STOCK.

(On South African Railways the length of trains for men is usually limited to about 8 to 10 vehicles, and 30 short trucks in a goods train.)

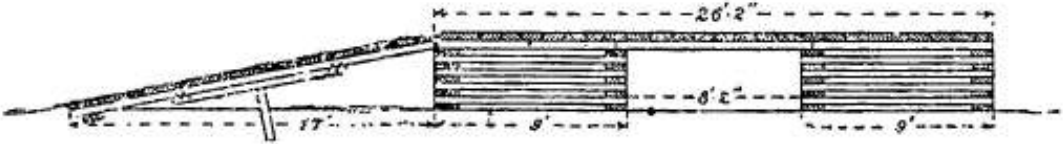
Passenger Stock.	Normal Accommodation.
First class	6 compartments. Sitting 36. Lying 24.
Second class	6½ compartments. Sitting 52. Lying 39.
Composite saloon ...	First class. Sitting 18. Lying 12. Second class. Sitting 27. Lying 21.
*Third class	7½ compartments. Sitting 60. Lying 15.

Other Stock.	
Long bogies	50 to 80,000 lbs. These are not suitable to accommodate men.
Short bogies	22,000 lbs.
†Short sheep	22,500 lbs. or 8 horses, or 10 mules or 20 men.
Bogie cattle truck ...	40,000 lbs. or 16 horses, or 20 mules, or 40 men.
Short cattle truck ...	22,000 lbs. or 8 horses, or 10 mules, or 20 men.
Horse boxes	Seldom available: Accommodate 2, 3 or 4 horses with proportion of attendants.

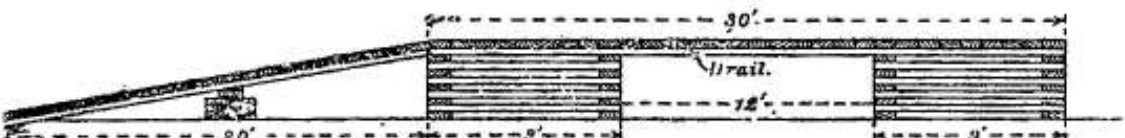
* For short coaches, calculate half this accommodation. This type is being eliminated. It is intended eventually to adopt the long coach as a standard type.

† Not procurable on Natal lines.

TYPES OF TEMPORARY RAILWAY PLATFORMS (made of Railway Material only).



Platform constructed of Sleepers only.



Double platform constructed of sleepers and rails.

xviii. PLATFORMS (*see diagrams*).

Constructed of Railway Material only.

i. Method of Construction.

1. A platform constructed of sleepers, to be serviceable must be very carefully made.

The chief points to be noted are:—

The site should be level if possible, the approaches good, and it must be remembered that space is required for ramps up to the platform.

A truck should be obtained and brought on the siding to the place where the platform is to be constructed.

To fix a longitudinal line for the front edge of the platform, drop a plumbob from the edge of the truck to the ground, and allow a space of 4 inches on a straight siding and 6 inches on a curved one.

To fix the height of the platform, measure the height of the floor of the truck above the level of the ground and deduct 3 inches.

Having ascertained this, calculate the numbers of sleepers in the cribs. If an even number the bottom sleepers should be laid longitudinally, and *vice versâ*, so that the top layer of sleepers may always lie transversely.

When using rails, always spike the rails to the top sleepers of the cribs.

Platforms for troop trains are only required for animals and vehicles. For animals the average length required is 100 yards. They should be 3′ 6″ to 4′ above rail level, and 2′ 3″ from nearest rail.

2. In India military platforms are ramped throughout to the rear, when possible, and the type of platform shown in the sketch would not be paved with sleepers; rammed earth, possibly finished off with road metal, would be used.

ii. Labour, Time, and Material required.

Under favourable conditions with the necessary material close to the site, the following may be taken as the time required for construction:—

Platform of sleepers only, single width, 100 yards long. 80 men, 4 hours, 800 sleepers.

Platform of sleepers and rails, single width, 100 yards long. 80 men, 4 hours, 500 sleepers, 30 thirty-foot rails.

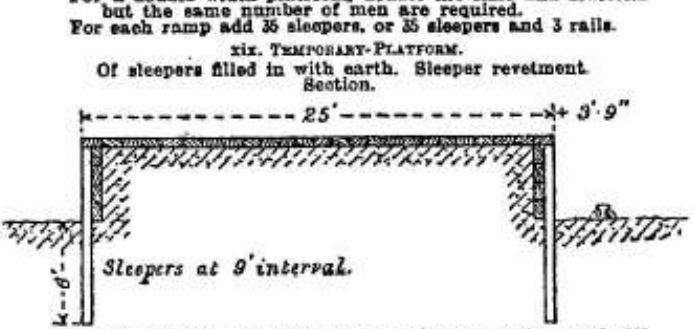
For a double width platform, double the time and material but the same number of men are required.

For each ramp add 35 sleepers, or 35 sleepers and 3 rails.

xix. TEMPORARY-PLATFORM.

Of sleepers filled in with earth. Sleeper revetment.

Section.



112 men, 8 hours, 124 feet length, 2 ballast trains used, 885 sleepers.

DEFINITIONS.

Terms requiring definition:—

Chairs—connect rail with sleepers.
Keys—connect rails with chairs (they are wedges).
Fishplates—plates connecting one rail with another.
Cross-over roads—to pass rolling stock from one line to another.
Points—rails fixed at one end and movable at the other, to lead a vehicle in either of two directions.
Crossings—gaps in rails by means of which a vehicle on one line of rails crosses another line of rails.
Through road—Combination of crossings, enables one line of rails to cross another, without means of communication between the two.
Sidings—allow rolling stock to remain out of danger while traffic is carried on on the main line.

43. TRANSPORT BY SEA.

1. The control, provision and despatch of the sea transport of military forces is the duty of the Admiralty, who are responsible for their protection while at sea and for their oversea communications. The requirements of the C. in C. are notified to the Admiralty by the Q.M.G. to the Forces.

2. A director of sea transport is appointed by the Admiralty and controls the arrangements in connection with the provision of sea transport in the theatre of operations on their behalf.

3. The general division of duties between the navy and army are as follows:—

Navy.—Control the shipping and landing of troops, animals, guns, baggage and stores at wharves, piers, or beach. Responsible for the provision and berthing of the necessary boats, tugs, etc., and labour, for the same. Control of entire beach up to high water mark and of such further portion of it and of piers and wharves as they consider necessary.

Army.—Beyond the portions alluded to above, responsible for the safety and transportation of men, animals, guns, vehicles, and stores. Supply military labour outside the limits of naval control, and within if required to by Navy.

Each service will render the other all the assistance possible.

4. Conveyance is provided by:—

Transports (ships wholly engaged for the Government service).

Freightships (ships in which conveyance is engaged for troops but not wholly at the disposal of the Government).

ii. POINTS IN INSPECTING SHIP.

1. *Accommodation.*—Officers, W.O.'s and S. Sjts., other ranks, sick, prison, state of hammocks and bedding, state of troop decks, places for kits and accoutrements, mess utensils, arm racks, magazines, baggage space, cooking galleys.
2. *Water.*—Amount, quality, arrangements for issue.
3. *Provisions.*—Good, sufficient.
4. *Sanitary.*—Latrines, urinals.
5. *Boats.*—Condition. Amount. Life saving apparatus.
6. *Animals (for).*—Stalls, fittings, forage, places for saddlery, harness, &c.; space for transport wagons, hoisting appliances.

iii. Points in Fitting of Transports.

1. Be able to embark or disembark night or day.
2. Derricks should be numerous and well fitted, with clear leads for whips and guys, and with rapid running winches to each hatch.
3. Hatches should be free of obstruction.
4. All hatches and decks to be worked during disembarkation should be well lighted.
5. Numerous boat ropes, accommodation ladders, and rope ladders should be available for each gangway.
6. Derricks should be capable of lifting 10 tons.

iv. Troops on Board Ship—Embarking.

1. Embark units complete on one ship, if possible.
2. Remember to embark last what is wanted first on disembarking.
3. Men must be told off to their messes. (Better if done in consultation with first officer of the ship.)
4. Stow sea-kit bags over mess tables.
5. Stow kit bags and waterproof bags in separate baggage room.
6. Stow rifles (without slings), properly labelled, in the armoury, if there is one, and the ammunition in the magazine.
7. Take over the bedding and utensils.
8. Instruct men how to roll bedding and sling hammocks.
9. Put ship's halters on horses, and unsaddle and unharness.
10. See to stowing of saddlery and harness. (Put together in sets and label.)
11. See to safe stowing of vehicles.
12. Leave 5 per cent. spare stalls, half on each side.
13. Troops are generally told off into guard (detailed daily), swabbers, &c. Tell off troop deck serjeants, sanitary serjeant, police, stable guard, &c.
14. Tell off troops to fire stations and boat stations, in consultation with ship's authorities.
15. Acquaint troops with ship's orders, fire signals, &c.

v. Bugle Calls on Board Ship.

Standfast	Silence; everyone to remain still.
Continue	Carry on. (Continue your business.)
Retire	Everyone off upper deck but the guard.
4 G's	Sweepers.
4 G's and double... ...	Swabbers.
Alarm	Man overboard.
Charge	Permission to smoke.
Lights out	Leave off smoking.
Fire alarm	Fire.
Close, 4 G's, Assembly...	Collision.
Commence firing... ...	Heave round pumps.
Cease firing	Avast pumping.

vi. Ship's Signals.

i. Ship's bell rung violently, stroke in quick succession, Fire.
ii. Rung quickly, followed by several short blasts on siren or whistle ... ... Collision.

At these signals all buglers will sound the necessary calls.

For man overboard. At the cry of man overboard the bugler on duty will, if ordered by the officer of the watch, at once sound the alarm. Every person is to remain quiet; those below will remain there.

vii. Slinging Horses on to a Ship.*

1. Horses should be unsaddled and unharnessed; ship's halter under head-collar, bridoon reins loose but knotted.
2. Do not let horse's head loose, fasten with double guy, one end being held on shore or in the boat, and one on the ship. Horses may fall backwards out of slings, but will never fall forward.
3. Five men required, one at head, one at each side, one at the breast, and one behind.
4. Pass one end of sling under belly, both ends being brought up to meet over back: one man passes his loop through the other loop, and it is received by the man on the other side, who hauls it through, hooking the tackle to it, both men holding the ends of the sling till taut. Men at the breast and behind then bring their ropes round and make them fast to grummets, and the man who holds the horse's head makes fast the guys to the ship's head-collar.
5. Fasten the breech band and the breast girth securely.
6. Blindfold timid or restless horses.
7. Two or three men must be at the hatchway and between the decks to guide the horse when being lowered.
8. Provide a mat or straw for the horse to alight on.

viii. Horses on Board Ship—Points to be attended to.

1. Sufficient and good water and forage.
2. Fittings good, sound, and up to date.
3. Animals properly sheltered.
4. Stores good and sufficient.
5. Accommodation for officers and men good and sufficient.
6. Ventilation good, windsails and fans in good order.
7. Feeding. Average ration ½ and ½; at first few oats and much bran, subsequently increase oats. Full ration of hay all through.
8. Clean ship frequently. Exercise on deck in fine weather. Cinders spread will give horses foothold.
9. Put horses next to each other who are accustomed to each other.
10. Hand rub horses' legs regularly.
11. In rough weather sacks filled with anything soft will often preserve horses from injury.

ix. Slinging Camels on to a Ship.

1. Camels about to be slung should be provided with a head collar with rope attached (a rope fastened round the neck so as not to form a slip knot and then a loop taken round the jaw will answer equally well). This prevents the men from hanging on to the nose-rope to steady the animal when first taken off its feet—a practice which is likely to tear out the nose-bag and cause great suffering to the animal.
2. Camels should be made to kneel down under the crane. The man holding the nose-rope then blindfolds the animal; two other men stand, one on each forearm, to prevent its rising; others slip the sling under the belly. Vicious animals require to have their mouths secured, and forelegs tied with a rope passing over the neck from one leg to the other. If necessary, two men stand one on each hock, to render the animal powerless.

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* If a ship is alongside a quay, horses can be more rapidly embarked by walking them on board by means of brows.

x. Camels on Board Ship—Points to be attended to.

1. Large sized camels should be accommodated in the lower hold, medium sized camels on the upper deck, small camels between decks; those on upper decks heads outwards, those between decks and in hold heads inwards. 8 feet 6 inches between decks is sufficient for camels to stand up.

2. On board camels should be ranged side by side, round the sides of the ship and made to sit, with their forelegs tied. No animals should be stowed amidships;

The decks should be covered with at least 6 inches of sand, and there should be half a ton of sand per camel, in addition, for a voyage not exceeding 15 days.

3. Every camel should be fitted with harness, secured to rings or spars lashed on to the deck, to prevent the animals from shifting their positions.

4. In fine weather the leg ropes of a few at a time may be cast off and the animals allowed to rise: and, if space allows, they should be exercised.

5. During the voyage great care should be paid to the bend of the knees, and hooks. The sand the animals lie upon works into these parts, and if they be kept sitting for long periods, it causes irritation and the formation of ulcers.

xi. Slinging Guns and Vehicles.

1. For slinging guns and limbers, the following method has been found to work well.

Two four-inch slings are used, one round each axletree, and a hook rope hooked into the trail eye. The bights of the sling placed on the tackle hook, to which the end of the hook rope is also made fast.

Limbers have their poles removed and are slung in the same way as guns, the hook rope in their case being made fast to the tackle hook from the trial hook.

2. G.S. wagons and pontoon wagons can be slung by four chain slings connected to a common link at one end and provided with hooks at the other, these four hooks are then secured to all four wheels of the vehicle.

Vehicles will, as a rule, be embarked loaded on their wheels, all loose articles being stowed within the wagons, the poles and shafts being removed before slinging. If the wheels are removed, special care must be taken that the linch pins and washers are put away. Those carriages first required on disembarkation should be stowed away last.

44. TONNAGE TABLES.

1. The figures given in the following tables are approximate only. No allowance has been made for motor cars, nor for the trucks and engines of a Transport and Supply Park.

Allowance has been made for vehicles, stores, ammunition, coal, etc.

2. The calculations are based on a scale of 4 tons per man, and 12 tons per horse for ocean voyages, and 2 tons per man, and 8 tons per horse for short voyages.

Ocean voyage means that troops are conveyed in transports fitted up in accordance with the Admiralty Transport Regulations. For short voyages no fittings for men would be provided and only the simplest fittings, consistent with security, for the horses.

3. Gross tonnage is the total cubic space below deck and the total cubic contents of closed spaces above deck.

Net tonnage is the gross tonnage minus all spaces not available for freight and after deducting accommodation for the crew and the space taken up by the engine rooms, coal bunkers, &c.

Freight tonnage. This is simply a measure of cubical capacity, a freight-ton being 40 cubic feet of cargo space.

II. Gross Tonnage Tables.

(Home Est.)

Unit.	Ocean Voyage.	Short Voyage 24 hours and under.
Hd. Qrs. of a Cav. Division	1,200	750
" " Division	1,300	800
" " Cav. Bde.	600	400
" " Mounted Bde.	600	400
" an Infantry Bde....	500	350
Cav. Regt. Hd. Qrs. and Mach. Gun Section	1,150	850
" " Squadron	2,750	1,700
" " complete	9,250	5,800
1 Squadron Yeomanry	2,800	1,750
Hd. Qrs. Cav. Divl. or Divisional Art. ...	100	350
H.A. Battery (13-pr.)	3,650	2,300
" Ammn. Coln. (13-pr.)	4,400	2,800
" Brigade (13-pr.)	12,200	7,700
F.A. Battery (18-pr.)	3,000	1,850
" Ammn. Coln. (18-pr.)	5,950	3,750
" Brigade (18-pr.)	15,400	9,600
" Battery (5-in. Howr.)	2,750	1,700
" Ammn. Coln. (5-in. Howr.)	2,450	1,550
" Brigade (5-in. Howr.) 2 batteries ...	8,250	5,150
Heavy Battery (60-pr.)	2,200	1,350
" Ammn. Coln. (60-pr.)	1,000	650
" Batt. and Ammn. Coln. (60-pr.) ...	3,150	1,950
H.A. with Mounted Bde. Batt.	3,800	2,400
" " " Ammn. Coln. ...	2,300	1,550
" " " Total	6,100	3,850
Divisional Ammn. Coln.	15,900	10,100
Hd. Qrs. Cav. Divl. or Divisional Eng. ...	200	150
Field Troop	1,350	850
Field Co.	1,750	1,050
Wireless Telegraph Co.	900	550
Divisional Telegraph Co.	750	450
Signal Co. (Cable)	2,200	1,350
" (Air Line)	2,800	1,750
Balloon Co.	900	550
Bridging Train	4,900	3,100
M.I. Battalion	9,300	5,800
* " Company	2,650	1,650
Infantry Battalion	4,950	2,650
Field Ambulance	2,200	1,300
Cavalry Field Ambulance	1,400	850
Clearing Hospital	450	250
Stationary "	450	250
General "	850	450
Infantry Brigade...	20,350	10,600

* Add 50 tons when acting as Divisional M.I.

TONNAGE TABLE—*continued.*

Unit.	Ocean Voyage.	Short Voyage 24 hours and under.
Division*	165,800	97,500
Cavalry Brigade	28,300	17,800
" Division*	158,100	98,900
Mounted Brigade*	37,400	23,500
Rate for separate calculations—		
Per man	4	2
" horse	12	8

* Includes old A.S.C. units.

For separate calculations the following figures should be used:—

	Tons.
13 pr. with limber and pole	13¼
Ammunition wagon for 13 pr. with limber and pole (no ammunition)	11
18 pr. with limber and pole	14½
Ammunition wagon for 18 pr. with limber and pole (no ammunition)	11½
60 pr. with limber and pole	22¾
Ammunition wagon for 60 pr. with limber and pole (no ammunition)	13
G.S. wagon, Mark X, with wheels and pole	9½
Ambulance wagon, Mark VI (wheels inside), and pole	15½

III. (INDIAN EST.)

Unit.	Ocean Voyage.		Short Voyage.	
	Without Tents.	With Tents.	Without Tents.	With Tents.
HEADQUARTERS.				
Army	3,750	3,800	2,250	2,350
Cavalry Division	2,100	2,150	1,300	1,350
Division	2,000	2,100	1,250	1,300
Infantry Brigade	680	760	420	470
Cavalry Brigade	1,000	1,050	400	450
Line of Communication	1,220	1,220	750	750
Base of Operations	1,200	1,200	700	700
BRITISH CAVALRY.				
Headquarters	1,100	1,100	680	700
One squadron	2,750	2,800	1,750	1,800
Whole regiment	12,100	12,350	7,600	7,750
INDIAN CAVALRY.				
Silladar—				
Headquarters	950	950	600	600
One squadron	2,900	2,850	1,750	1,800
Whole regiment	12,800	12,550	7,700	7,800
" minor expedition	14,700	14,900	9,100	9,200

INDIAN EST.—*continued.*

Unit.	Ocean Voyage.		Short Voyage.	
	Without Tents.	With Tents.	Without Tents.	With Tents.
INDIAN CAVALRY—CONT.				
Non-Silladar—				
Headquarters	850	900	550	550
One squadron	2,850	2,900	1,800	1,800
Whole regiment	12,150	12,400	7,650	7,800
ARTILLERY UNITS.				
Royal Horse Artillery Brigade	9,650	9,900	6,050	6,250
Ammunition Column	3,550	3,600	2,200	2,250
Royal Horse Artillery Battery	4,550	4,700	2,850	2,950
Section Ammunition Column	1,750	1,800	1,100	1,150
Royal Field Artillery Brigade	11,350	11,750	7,100	7,300
Section, Divisional Ammunition Column	5,350	6,000	3,750	3,800
Royal Field Artillery Battery	3,700	3,850	2,300	2,400
Sub-Section Ammunition Column ...	1,950	2,000	1,250	1,250
5-inch Howitzer Brigade	10,550	10,800	6,550	6,700
Ammunition Column	4,150	4,250	2,600	2,650
5-inch Howitzer Battery	3,450	3,550	2,150	2,200
Ammunition Column	1,350	1,400	850	900
30-pr. or 4-inch Heavy Battery	2,650	2,700	1,650	1,700
Ammunition Column	1,650	1,700	1,050	1,100
5-inch Heavy Battery	4,200	4,250	2,600	2,650
Ammunition Column	1,650	1,700	1,050	1,100
Headquarters, Brigade of Heavy Batteries	200	200	150	150
Headquarters, Brigade of Mountain Artillery, British or Indian	200	250	150	150
British Mountain Battery	4,750	5,150	2,900	3,150
Indian Mountain Battery	4,600	4,900	2,800	3,150
Ammunition Column for British or Indian Mountain Battery	450	450	250	250
AMMUNITION COLUMNS.				
Cavalry Brigade, S.A.A. Section	1,200	1,200	750	750
Cavalry Brigade	2,950	2,950	1,900	1,900
Cavalry Division (2 Brigades)	5,900	5,900	3,800	3,800
Cavalry Division (3 Brigades)	8,850	8,850	5,700	5,700
Infantry Brigade, S.A.A. Section ..	1,850	1,850	1,250	1,250
Divisional Ammunition Column, F.A. Section	5,050	6,030	3,770	3,890
Divisional Ammunition Column, Mn. Art. Section...	860	860	550	550
Divisional Ammunition Column, S.A.A Section	7,160	7,160	4,540	4,540
Divisional Ammunition Column... ...	14,970	15,050	8,860	8,910

INDIAN EST.—*continued.*

Unit.	Ocean Voyage.		Short Voyage.	
	Without Tents.	With Tents.	Without Tents.	With Tents.
ENGINEER UNITS.				
Cavalry Divisional Engineers	250	800	150	150
Divisional Engineers	250	800	150	150
Field Troop of Sappers and Miners ...	1,500	1,550	950	950
Field Company of Sappers and Miners...	2,400	2,500	1,400	1,500
Railway Company of Sappers and Miners	2,000	...	1,000	...
Printing Section	200	200	100	100
Photo-Litho. Section	200	200	150	150
Pontoon Section	5,450	5,500	3,500	3,550
Overseas Telegraph Section	4,800	4,850	3,950	4,000
Engineer Field Park	1,450	1,450	900	900
" Siege "	2,550	2,650	1,600	1,650
Balloon Section	2,150	2,150	1,350	1,300
INFANTRY UNITS.				
British Infantry Battalion...	7,300	7,700	4,300	4,450
Indian " "	6,400	6,700	3,850	3,850
" Pioneer "	7,050	7,350	4,050	4,300
British Mounted Infantry Battalion ...	12,500	12,500	7,900	7,900
MEDICAL UNITS.				
Cavalry Field Albulance (British) ...	3,300	3,400	2,000	2,100
Field Ambulance (British)	2,750	2,850	1,650	1,750
Cavalry Field Ambulance (India) ...	3,050	3,100	1,850	1,900
Field Ambulance (Indian)	2,500	2,600	2,500	1,650
Field X-Ray Section	200	200	150	150
Field Medical Stores Depot	200	200	150	150
OTHER UNITS.				
Ordnance Reserve Equipment for one Division	25,700	25,800	16,250	16,450
Survey Party	400	400	350	350
Field Post Office, 1st Class	100	100	50	50
" " " 2nd Class	50	50	50	50
SUPPLY COLUMNS.				
Cavalry Brigade	2,300	2,300	1,400	1,450
Cavalry Divisional (for 2 Brigades) ...	4,400	4,600	2,800	2,900
" " (for 3 Brigades) .	6,600	6,900	4,200	4,350
British Infantry Brigade	2,180	2,300	1,400	1,500
Indian " "	2,000	2,100	1,270	1,320
Mixed " "	2,430	2,550	1,550	1,630
Divisional Troops	2,900	3,000	1,850	1,950
Divisional (Mixed Brigades)	10,300	10,700	6,650	6,850

INDIAN EST.—*continued.*

UNITS.	Ocean Voyage.		Short Voyage.	
	Without Tents.	With Tents.	Without Tents.	With Tents.
HIGHER UNITS.				
Cavalry Division (3 Brigades)	14,500	157,400	97,200	98,700
" " (2 Brigades)	104,000	106,400	65,200	66,800
Cavalry Brigade	50,750	51,750	31,800	32,500
Division (Homogeneous Brigades) ...	165,500	172,250	97,200	101,850
Division (Mixed Brigades)	165,000	172,850	98,500	103,200
Divisional Troops (British Mountain Batteries)	83,050	85,200	50,650	52,750
Divisional Troops (Indian Mountain Batteries)	83,500	85,650	50,900	53,000
British Infantry Brigade	29,900	31,600	17,150	18,350
" " " (Independent)	34,100	36,950	19,650	20,900
Indian Infantry Brigade	26,200	27,600	15,000	15,900
" " " (Independent)	30,700	32,300	17,800	18,800
Mixed Infantry Brigade	27,150	29,550	15,550	16,450
" " " (Independent)	32,200	33,850	18,700	19,750

CHAPTER VII.

45. PAY.

The arrangements for pay of an army are under a Paymaster-in-Chief responsible to the Q.M.G.

I. Regimental Daily Pay.

(Not applicable to India).

This table is for guidance only and is not to be quoted as an authority. Owing to possible changes the correctness of the rates is not guaranteed.

Rank.	R.H.A.	R.F.A.	R.G.A.	R.E.	Hld. Cav.	Cav.	Foot Gds.	Inf.	A.S.C.
	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
Serjeant or Corporal-Major	6 0	5 10	5 10	6 0	5 10	5 4	5 2	5 0	5 6
Bandmaster	...	...	6 0	6 0	5 6	5 6	5 0	5 0	...
Quartermaster-Serjeant or Corporal-Major	4 4	4 2	4 2	4 6	4 6	4 4	4 0	4 0	4 3
Squadron Serjeant-Major or Cpl.-Major or Colour-Serjeant or Battery or Company Serjeant-Major	4 4	4 2	4 0	3 9	4 6	4 4	3 8	3 6	4 3
Farrier Quartermaster-Serjeant or Corporal...	4 5	4 3	...	4 6	4 8	4 0	...	...	4 3
Squadron Battery or Company Quartermaster-Serjeant ...	4 4	4 2	3 9	3 9	3 6	3 4	...	...	4 0
Corporal of horse or Serjeant	3 4	3 3	3 2	3 3	3 0	2 8	2 6	2 4	2 7
Serjeant trumpeter, drummer, bugler, or piper	3 4	3 2	3 3	4 6	3 2	2 8	2 6	2 4	...
Corporal	2 8	2 6	2 6	2 6	2 8	2 0	1 9	1 8	2 0
*Bombardier or 2nd Corporal	2 5	2 3	2 3	2 2	...	...	...	...	1 9
Paid Lance-Corporal or act. Bombardier	1 9	1 7	1 7	1 6	...	1 5	1 4	1 3	1 5
Trumpeter, drummer, bugler, or piper	2 0	1 2½	1 2½	1 1¾	1 11	1 4	1 3	1 1	1 2
Gunner, sapper, or private	1 4	1 2½	1 2½	1 1½	1 9	1 2	1 1	1 0	1 2
Driver	1 8	1 2½	1 2½	1 1½	...	...	...	...	1 2
Boy	0 8	0 8	0 8	0 8	0 8	0 8	0 8	0 8	0 8

* 2/2 Mech. Transport Cos.

In addition to the above the W.O.'s, N.C.O.'s and men receive 3d. daily Messing Allowance and Clothing Allowance, Service Pay at from 4d. to 7d. daily, or Proficiency Pay at from 3d. to 6d. daily or corps or Engineer pay is also issuable.

Field Allowances (all Services):—	s.	d.
Lieutenant-Col. and Major	4	0
Captain	3	0
Lieutenant and Second Lieutenant	2	6
Warrant Officer	1	0

ii. Pay Arrangements.

1. The regimental paymaster of a base regimental pay office affiliated to a base record office will keep the ledger account, compile the pay list, render non-effective accounts, and issue pay certificates of units, services and departments, and undertake all other financial transactions except that of making individual cash payments to the men. The duty of making cash payments will devolve upon the officer under whose immediate command an individual happens to be serving at the time of payment.

2. No officer will be exempted from receiving an imprest of public money to make any payment which cannot, conveniently, be made through another channel, and every officer commanding a company, &c., will have from time to time to draw money wherewith to make cash payments on account of the men under his immediate command.

3. An officer commanding a company, &c., will render a simple cash account of all public monies received and disbursed by him. This will be made out on the last day of every month on Army Form N 1531A, and will be sent to his base record office.

4. When it is considered desirable to pay the men under his command, the officer in command of a company, &c., will obtain such funds as he requires from the nearest cashier. When indenting for money he will only draw such sums as are absolutely required for immediate use.

5. In making advances of cash on account to any person under his command he will be guided by the information given in the man's pay book (Army Book 64) as to the net amount of his pay, and will not issue more than is shown by the book to be due up to date. He will be personally responsible for over-issues that he may make.

6. Temporary additional emoluments claimed by a soldier will not be issued until a notification is received from the regimental paymaster showing that the sum claimed has been placed to the credit of the soldier's pay account. All terminal payments, such as gratuities or deferred pay, will be paid by the regimental paymaster, and the officers in command of companies, &c., should not make advances in respect of them.

7. Officers in command of companies, &c., will enter the amount of every cash payment in the man's pay book, and will attest the entry by their signature. They will secure the soldier's receipt on the acquittance roll (A.F. N 1513), which will be forwarded to the base record office, a carbon copy being kept for reference. The rolls will be numbered consecutively, and the number, date, and total amount of each roll will be shown in his monthly cash account.

8. In the event of an officer obtaining money from a bank or post-office, or from any source other than a cashier, he will at once enter it in his cash account, giving full particulars for the information of the paymaster concerned.

iii. India.

1. In India there are no field allowances. Certain officers, mostly medical officers, are allowed to draw horse allowance in the field if they are not entitled to it in peace. Rations are free to all except officers. The latter are supplied with rations on payment, and are required to credit Government with the value when drawing their pay.

2. Cash is drawn from treasure chest officers, attached to headquarters of divisions, armies, and detached forces.

3. The accounts of Indian units are kept at their depôts, and of British units by the divisional disbursing officer of their divisions.

4. A soldier may obtain a cash advance from any officer having charge of public money in the field, the officer in charge of the accounts of the man's corps being informed.

46. CLOTHING.

1. The arrangements for the clothing and equipment of an army in the field are controlled by the director of ordnance services, under the instructions of the I.G.O.

2. Clothing is divided into:—

(a) Personal:—Ankle boots and shoes, caps, drawers, canvas suits, service dress suits, puttees, sashes, cardigan waistcoats, trousers, tunics, leather gloves.

These become the property of the soldier, and may be sold by permission of the O.C. the squadron, battery, or company (in peace only).

(b) Public:—Greatcoats, full dress head-dresses, knee boots, leather breeches, spurs jack, foreign service helmets, leggings, waterproof capes, purses and belts for Highland regiments.

These must be returned to store, and are the property of the public.

(c) Necessaries:—Badges, blacking, laces, braces, brushes, button brasses, combs, cotton drawers, forks, gauntlets, grease tins, worsted gloves, holdalls, hosetops, housewives, knives, polishing powder, razors, shirts, socks, sponges, pipeclay, spoons, spurs, swan-neck, towels, vests.

A free kit of necessaries is supplied to each soldier on enlistment, and this has to be kept up afterwards at the soldier's expense, for which purpose an allowance is made to him (in peace only). On field service necessaries are issued free to replace losses not caused by negligence.

(d) Sea-kit:—Clothes-bags, woollen belts, marine soap.

47. FIELD KITS.

(Not applicable to India.)

A.—Officers.

Detail of articles taken into the field by each officer.

Notes.—1. *The following list is drawn up as a general guide, and the articles in it may be varied, but the total weight (exclusive of camp kettles) of 50 lbs. for a commanding officer, or 35 lbs. for other officers, to be carried in regimental transport, must not be exceeded.*

2. *Wherever names of articles appear in italics the weight of the article so printed is included in a total given elsewhere in the table.*

Articles.	Number, how carried, and weight.						Remarks.
	Dismounted—on the person.	Mounted.		In regimental transport.	Approximate weight of each.		
		On the person.	On the horse.		lbs.	oz.	
Clothing and Personal Effects.							(a) Packed in valise. (b) Officers of kilted regiments wear in lieu, apron, garters, hosetops, kilt, shoes, spats, which add about 1 lb. 12 oz. to the weight of the clothing.
Boots, lace ... pairs	1(b)	1	...	1(a)	2	11	
Braces ... ... "	1	1	...	...	0	4	
Brushes: *hair* ...	...	...	1 (c)	1(d)	...		
Brushes: *shaving* ...	...	...	1(c)	1(d)	...		
Brushes: *tooth* ...	...	...	1(c)	1(d)	...		
Caps: forage ...	...	...	...	1(a)	0	9	
Caps: *sleeping (in pocket of greatcoat)* ...	1	...	1	...	0	3½	

A.—Officers—*continued.*

Articles.	Number, how carried, and weight.					Remarks.
	Dismounted—on the person.	Mounted.		In regimental transport.	Approximate weight of each.	
		On the person.	On the horse.			
					lbs. oz.	
Clothing and Personal Effects—*contd.*						
Comb	...	...	1(c)	1(d)	...	
Compass, magnetic, pocket	1	1	...	...	0 4	(c) In holdall, packed in wallet.
Disc, identity, with cord	1	1	...	...	0 0½	
Dressing, field	1	1	...	...	0 2	
Fork, table	...	...	1(c)	1(d)	...	(d) Dismounted officers only—in holdall packed in valise.
Grease or vaseline tin	...	...	1	1(d)	0 2	
Greatcoat, with sleeping cap in pocket ...	1	...	1	...	7 5	
Handkerchief	1	1	...	...	0 2	(e) One camp kettle is allowed for every three officers, who pack into it their cups, plates, and pepper and salt pots. Dismounted officers pack, in addition, their knives, forks and spoons.
Helmet and pagri ...	1	1	...	...	0 13½	
Holdall { (f)	...	...	1	1(c)	1 3	
Holdall { (g)	...	...	...	1(a)	1 0	
Housewife	...	...	...	1(a)	0 4	
Knives { clasp, with ring and swivel ...	1	1	...	...	0 6	
Knives { *table*	...	...	1(f)	1(e)	...	
Leggings (or puttees) pairs	1(b)	1	...	1(a)	0 13	
Map	1	...	1	...	0 2	
Matches ... boxes	1	1	...	...	0 1	
Portfolio, with writing materials	...	...	...	1(a)	1 0	(f) Mounted officers only. Contains knife, fork, spoon, razor, comb, hairbrush, shaving brush and toothbrush.
Razor	...	...	1(f)	1(g)	...	
Shoes, canvas ... pairs	...	...	...	1(a)	1 5	
Soap ... pieces	...	...	1(c)	1(d)	0 3	
Socks ... ... pairs	1	1	1	1(a)	0 4	
Spoon	...	...	1(f)	1(e)	...	
Spurs ... ... pair	...	1	...	...	0 12	(g) Dismounted officers only. Contains comb, razor, hairbrush, shaving brush and toothbrush.
Suit, service dress ...	1(b)	1(b)	...	1(a)	4 12	
Towels	...	...	1	2(a)	0 13	
Underclothing ... suits	1	1	1	1(a)	3 0	
Watch, in wrist strap ...	1	1	...	...	0 4	
Equipment, Etc.						
A. B. 181	1	1	...	...	0 10	(b) Jacket and riding breeches.
Ammunition, Webley pistol ... rounds	12	12	...	...	...	
Bags { corn	...	...	1	...	0 6	
Bags { nose, G.S., with 6 lbs. corn ...	...	...	1	...	7 0	
Belt, Sam Browne, including ammunition, ammunition pouch, revolver and case, and also frog for dismounted officers ...	1	1	...	...	4 8½	Weight without frog.

A.—OFFICERS—*continued.*

Articles.	Number, how carried, and weight.					Remarks.
	Dismounted—on the person.	Mounted.		In regimental transport.	Approximate weight of each.	
		On the person.	On the horse.			
EQUIPMENT, ETC.—*contd.*					lbs. oz.	* Artillery officers carry field glasses on the person, other mounted officers carry them on the horse.
Brush, horse	...	...	1	...	0 10	
Bucket, canvas	...	...	...	1(*a*)	1 5	
Cup, enamelled, drinking	...	...	1	1(*a*)	0 8	
Cutters, wire ... pair	1	...	1	...	1 4	
Field glass or telescope (or both) in one case...	1	1*	1*	...	2 0	(*j*) Mounted officers carry the emergency food in wallets.
Haversack, with unused portion of bread or biscuit ration (say 12 oz.); and emergency food (9½ oz.)...	1	1(*j*)	...	...	2 0½ / 2 10	(*k*) In mounted units other than artillery heelropes are allowed for use with restive horses, on a scale of 25 per cent. An additional peg is issued with each heelrope. Only 25 per cent. are required in artillery units, and these are carried in transport vehicles.
Kettle, camp	...	...	...	1(*c*)	...	
Lantern, collapsible, with tale sides ...	...	...	...	1(*a*)	0 12	
Mess tin (sealed pattern)	1	...	1	...	1 9	
Pad, surcingle	...	...	1	...	...	
Peg, picketing	...	...	1(*k*)	...	1 3	
Plates, enamelled... ...	...	...	...	2(*c*)	...	
Pocket book, field service	1	1	...	...	0 6½	
Pots, for pepper and salt	...	...	...	2(*c*)	...	
Rations: *unused portion of bread or biscuit ration (in haversack)*	1	1	...	...	0 12	
Rations: *emergency food*	1	...	1 (*j*)	...	0 9½	(*l*) In case on Sam Browne belt. There is no special pattern of revolver, but it must carry Government ammunition.
Revolver	1(*l*)	1(*l*)	...	...	2 3½	
Ropes: heel	...	...	1(*k*)	...	0 11	
Ropes: picketing	...	...	1(*k*)	...	0 15	
Rubber, horse	...	...	1	...	0 10	
Saddlery, complete, with bridle and headrope ... ... set	...	...	1(*m*)	...	38 0	(*m*) Includes weight of saddle blanket. Saddle blankets for officers' horses are carried in transport vehicles on the march.
Shoe cases, each with shoe and nails ...	...	...	2	...	1 10	
Sword, scabbard and sword knot	1	...	1	...	3 0	
Valise, Wolseley or other pattern	...	...	...	1	11 3(*n*)	(*n*) Weight when empty.
Waterbottle (filled), with carrier and strap	1	1	...	...	3 12	
Whistle and lanyard ...	1	1	...	...	0 2½	

NOTE.—In addition to the foregoing list, officers may, at their own discretion, provide saddlebags. If an officer is allowed more than one horse saddlebags can be carried on the spare horse.

B.—Mounted Men.

Warrant Officers, Non-Commissioned Officers and Men.

Details of articles taken into the field by each man.

Note:—*Wherever names of articles appear in italics the weight of the articles so printed is included in a total given elsewhere in the table.*

Articles.	No. and how carried. On the person.	On the horse.	Approximate weight of each.	Remarks.
			lbs. oz.	
Clothing and Necessaries				
Boots, ankle ... ... pair	1	...	3 14	*For R.A.M.C. and A.S.C. attached to R.A.M.C.
Braces ... ... "	1	...	0 4½	
Brassard*	1	...	0 0½	
Brushes { *shaving* (a)	1	...	0 1	
Brushes { *tooth* (a)	1	...	0 1	(a) In haversack.
Cap, comforter (b)	...	1	0 3½	
Comb (a)	1	...	0 1	(b) In pocket of greatcoat.
Disc, identity, with cord	1	...	0 0½	
Drawers, cotton ... ... pair	1	...	0 15½	
Dressing, field (c)	1	...	0 2	(c) Inside skirt of jacket.
Fork (a)	1	...	0 3½	
Greatcoat (d)...	...	1	7 8	(d) Strapped on front of saddle. Comforter, cap, and a pair of socks are contained in the pocket.
Helmet, Wolseley	1	...	0 14½	
Holdall (a)	1	...	0 4	
Housewife, filled (a)	1	...	0 3½	
Jacket, service dress with pay-book in pocket	1	...	2 8	
Knife, clasp (with marline spike, tin-opener, and lanyard) ...	1	...	0 7½	
Knife, table (a)	1	...	0 3½	
Laces, spare (a) ... ... pair	1	...	0 0½	†In right breast pocket of service dress jacket.
Pantaloons ... ... pair	1	...	2 6	
Paybook (*A.B. 64*)†	1	...	0 2	
Puttees	1	...	0 13	
Razor and case (a)	1	...	0 3	(e) In warm weather the cardigan may be carried in folds of greatcoat.
Shirt, flannel...	1	...	1 1½	
Soap (a) ... ... *piece*	1	...	0 2	
Socks, worsted ... ... pairs	1	1(b)	0 4½	
Spoon (a)	1	...	0 2½	
Spurs, jack ... ... pair	1	...	0 15½	
Titles, metal, for shoulder straps	2	...	0 0¾	
Toggle, hand (a)	1	...	0 9	
Waistcoat, cardigan (e)	1	...	1 6	

B.—Mounted Men. Warrant Officers, Etc.—*continued.*

Articles.	No. and how carried. On the person.	On the horse.	Approximate weight of each.	Remarks.
			lbs. oz.	
Equipment, Etc.				
Ammunition, ·303-inch, per 10 rounds ... ... in chargers	(*e*)	..	0 16½	
Bags, { corn	...	1	0 6	
Bags, { nose (with 6 lbs. of corn)	...	1	7 0	(*e*) For rounds carried *see* page 130.
Bandolier (not including ammunition)	1	...	1 8	
Belt, waist, brown leather (*f*) ...	1	...	0 7	
Brush, horse	...	1	0 10	(*f*) All ranks who carry mekometers or are armed with pistols.
Field glasses (*g*) ... ... pair	1	...	2 0	
Harness, near, with saddle blankets, and head ropes (*h*) set	...	1	73 0	
Haversack with—				
i. Unused portion of bread or biscuit ration (say 12 ozs.)				(*g*) Warrant and non-commissioned officers, and a proportion of other ranks.
ii. Emergency food (9½ ozs.)				
iii. Knife, fork and spoon (9 ozs.) (*g*)				
iv. Tooth brush, shaving brush, comb, razor and case (6 ozs.) (*g*) ...	1	...	4 6	(*h*) Drivers only. Add heel-rope (11 ozs.) when necessary.
v. Spare boot laces (¼ oz.) (*g*)				
vi. Housewife, fitted (3½ ozs.)				(*f*) Drivers only.
vii. Towel and soap (12 ozs.)				
Leggings (*f*)	1	...	2 0	(*k*) For certain ranks not armed with a rifle.
Mess-tin, and strap, with unused portion of meat ration (say 12 ozs.)	...	1	2 2	(*l*) In messtin.
Pad, surcingle	...	1	0 10	
Peg, picketing	...	1	1 4	
Pistol, with lanyard, cleaning rod and case (*k*)	1	...	2 14	
Pouch, pistol ammunition, for 12 rounds (*k*)	1	...	0 9	
Rations, { *unused portion of bread or biscuit ration (say 12 ozs.)* (*a*)	1	...	0 12	
Rations, { *unused portion of meat rations (say 12 ozs.)* (*l*)	...	1	0 12	
Rations, { *emergency food (9½ ozs.)* (*a*)	1	...	0 9½	

B.—Mounted Mtn. Warrant Officers, Etc.—*continued.*

Articles.	No. and how carried. On the person.	On the horse.	Approximate weight of each.	Remarks.
			lbs. oz.	
Equipment, Etc.—*continued.*				
Rifle, short, with oil bottle, pull-through, sling and rifle bucket (m)		1	10 11½	(m) Rank and file of cavalry and M.I., and proportion of artillery.
Rope, picketing		1	1 1	
Rubber, horse		1	0 10	(n) Except drivers. 1902 pattern. Add bucket-rope (11 ozs.) when necessary.
Saddlery, with saddle blanket and head rope (o) ... set ...		1	29 4	
Shoe case (and frog sword), with strap, and with one fore and one hind shoe and nails (o)		1	0 12	(o) All ranks of cavalry except drivers.
Sword, scabbard and sword knot (o)		1	4 8	
Water-bottle, filled, with carrier and strap	1	...	3 13	(p) Warrant officers, staff-sergeants, and sergeants.
Whip (f)	1	...	0 14½	
Whistle, with thong or lanyard (p)	1	...	0 3	(q) In holdall.

NOTES:—i. The lance will form part of the field equipment of lancer regiments when specially ordered. Lance flags will not be carried.

ii. A ground sheet (weight 2 lbs. 8 ozs.) is carried in regimental transport for each warrant officer, non-commissioned officer and man.

iii. When specially ordered a blanket (4 lbs. 8 ozs.) is carried under the saddle or on limbers and ammunition wagons or on other wagons for each man.

iv. Troops wearing khaki drill sent on active service from a warm to a temperate climate will be supplied with service dress as soon as available.

v. In the case of artillery picketing gear is carried in the wagons.

C.—Dismounted Men.

Warrant Officers, Non Commissioned Officers and Men.

Detail of articles taken into the field by each man.

Pattern 1908 equipment.

Note:—*Wherever names of articles appear in italics the weight of the articles so printed is included in a total given elsewhere in the Table.*

Articles.	No. carried on the person.	Approximate weight of each.	Remarks.
		lb. oz.	
Clothing and Necessaries.			
Boots, ankle (a) ... ... pair	1	3 14	
Braces (a) ... ... pair	1	0 4½	For R.A.M.C.
Brassard	1	0 0½	
Brushes (b) { *shaving*	1	0 1	(a) For kilted regiments substitute :
Brushes (b) { *tooth*	1	0 1	lb. oz.
Cap, comforter (b)	1	0 3½	apron, kilt 0 12
Comb (b)	1	0 1	gaiters and rosettes... 0 2
Disc, identity, with cord	1	0 0½	gaiters, Highland 0 9½
Drawers, woollen (a) ... pair	1	1 1	hose tops ... 0 5
Dressing, field (c)	1	0 2	kilt ... 3 9
Fork (c)	1	0 3½	shoes Highland ... 3 [illegible]
Greatcoat (b)	1	6 8	
Helmet, Wolseley...	1	0 14½	
Holdall (b)	1	0 4	
Housewife, filled (b)	1	0 3½	
Jacket, service dress with pay-book in pocket	1	2 8	(b) In pack.
Knife, clasp (with marline spike, tinopener and lanyard)	1	0 7½	† In right breast pocket of service dress jacket.
Knife, table (c)	1	0 3½	
Laces, spare (b) ... ... pair	1	0 0½	
Paybook (A.B. 64)†...	1	0 2	
Puttees (a) ... ... pair	1	0 13	(c) Inside skirt of jacket.
Razor and case (b)	1	0 3	
Shirt, flannel	1	1 1½	
Soap (b) ... ... piece	1	0 3	(d) In warm weather the cardigan may be carried in the pack.
Socks, worsted ... ... pairs	2 (f)	0 4½	
Spoon (c)	1	0 2½	
Titles, metal, for shoulder straps	2	0 0½	
Towel, hand (b)	1	0 2	(e) In haversack.
Trousers, service dress (a) pair	1	1 15	
Waistcoat, cardigan (d)	1	1 6	(f) One pair in use, and one pair carried in the pack.
Equipment, Etc.			
Ammunition, ·303-inch, ball, per 10 rounds ... in chargers	(g)	0 10½	(g) For number of rounds carried *see* p. 120.
Bayonet with scabbard and frog	1	1 5	
Belt, waist, web	1	0 13	
Braces	2	0 4½	
Carriers, cartridge (h)	2	1 12	(h) Each to contain 75 rounds. Weight when empty.
Haversack with { unused portion of bread or biscuit ration (say 12 oz.) and emergency food knife, fork and spoon	1	2 15½ (m)	(k) Carried by sergeants, rank and file, drummers and buglers.
Implement, intrenching, pattern 1908 (with carriage) (k) ...	1	2 8	

C.—Dismounted Men, Warrant Officers, Etc.—*continued.*

Articles.	No. carried on the person.	Approximate weight of each.	Remarks.
Mess tin, with unexpended portion of meat ration (b)	1	2 0	(*l*) In holdall.
Pack, with supporting straps containing:—			
cap comforter, comb (*l*), greatcoat, housewife, laces (*l*), mess tin, razor and case (*l*), shaving brush (*l*), soap (*l*), socks, toothbrush (*l*), towel	1	1 10[(m)]	(m) Empty pack.
unused portion of bread or biscuit ration (say 12 oz.) in haversack...	1	0 12	
Rations — *unused portion of meat ration in mess tin* ...	1	0 12	
emergency food (in haversack	1	0 9½	
Rifle, chest, with oilbottle, pull-through, and sling	1	8 14½	
Waterbottle, filled, with carrier	1	3 14½	
Whistle, with lanyard	1	0 2(a)	(a) proportion of N.C.Os.

NOTES:—1. A ground sheet (weight 2lbs. 8 oz.) is carried in regimental transport for each warrant and non-commissioned officer, and for each man.

2. When *specially ordered*, a blanket (weight 4lbs. 8oz.) will be carried per man, in addition to the above. For the transport of these, infantry battalions and field ambulances will be allowed extra vehicles, *see p. 56*; in other units the blankets will be distributed amongst the horses and vehicles of the normal establishment.

3. Troops wearing khaki drill sent on active service from a warm to a temperate climate will be supplied with service dress as soon as available.

Field Kits—Approximate Weights.

By whom carried.	Weight of Outfit. On the person. lb.	oz.	On the horse. lb.	oz.	Remarks.
Officers { Mounted ...	56	0	77	0	
Officers { Dismounted ...	41	0	...		
Rank and file { *a* Mounted... ...	48	0	85	0	*a* Cavalry soldier.
Rank and file { *b* Dismounted ...	59	0	...		*b* Infantry soldier, 1908 pattern equipment, and entrenching tool.

ARTICLES LEFT AT THE BASE BY EACH MAN.

Kit bags, containing the spare kit detailed below, will be taken as far as the oversea base by each man, and will be left in charge of storemen at the general base depôt, to be forwarded only as may be deemed convenient to the service by order of the General Officer Commanding-in-Chief.

Articles.	No.	Remarks.
CLOTHING.		(a) Shoes, Highland, for kilted regiments.
Boots, ankle (a) ... pair	1	(b) The following services will leave at the base the articles shown against each :—
Cap, service dress or glengarry (b)	1	SERVING SOLDIERS.
Drawers (c) ... ... pair	1	Household Cavalry — Blue serge frocks, blue serge or tweed trousers and forage caps.
Jacket, service dress (b) ...	1	Foot Guards — White jackets and tweed or tartan trousers.
Shoes, canvas (if in possession) ... ... pair	1	Military police, clerks and others who do not receive service dress in peace — Blue clothing and forage caps.
Trousers, service dress (b)...	1	Highland Light Infantry — White jackets and S.D. trousers.
NECESSARIES.		Royal Army Medical Corps — Khaki frocks and trousers.
Badge, cap	1	Kilted regiments — White jackets and trews.
Braces (d) ... ... pair	1	(c) Kilted regiments, 2 pairs.
Brush, hair	1	(d) Kilted regiments only.
Shirt, flannel	1	
Socks, worsted ... pair	1	
Towel	1	
Hosetops (d) ... ... pair	1	
SPECIAL ARTICLES.		
Bag, clothes	1	

The boots or Higland shoes will be tied together, with the soles outwards, the regimental number of the man and the name or number of the unit being chalked or otherwise legibly marked on the soles. The boots or Highland shoes will be placed in the mouth of the kit bag to admit of their being readily withdrawn, should it be necessary to order them to be forwarded to the troops in the field.

§. INDIA.

Extra clothing is issued to troops leaving the base on one of two scales, summer or winter, according to the tables below. The difference is issued in the fields to troops who have originally received the summer scale. Renewals on the sanction of brigade commanders are obtained from the supply service.

SCALE OF FREE ISSUES OF FIELD SERVICE CLOTHING FOR BRITISH TROOPS INDIAN TROOPS AND FOLLOWERS.

Item No.	Articles of clothing. The Summer scale is issued between 1st April and 1st October: the Winter scale between 1st October and 1st April.	British troops.		Departmental Officers with hon. rank and W. Os. of the ordnance and subordinate medical depts., S.&T. corps, military works services and miscellaneous unattached list (i).		N.C.Os. of the ordnance and subordinate army veterinary departments, S. and T. corps, military works services and miscellaneous unattached list (g).		Native Troops.				Public followers and regimental private followers (paid by the unit) who are permitted to be taken on service under the F.S. Manuals (k).		Telegraph department.	Postal department.	Clerks and agents and men of this class, and subordinates of the civil departments below the status of an officer.
		Summer.	Winter.	Summer.	Winter.	Summer.	Winter.	Summer.	Winter.	Summer.	Winter.	Summer.	Winter.	Summer and Winter.	Summer and Winter.	Summer and Winter.
1	2	3	4	5	6	7	8	9	10	11	12			13	14	15
1	Black-pads ... ... No	1 (a)	1 (a)	1 (a)	1 (a)	1 (a)	1 (a)	...	...	...	...			of field service clothing, corps, see F.S. Manual.	Europeans as for British troops; natives as for native troops. As for public followers.	Europeans and Eurasians as for British troops, others as for native troops (m). As for public followers.
2	Belts, leather ... ... ,,	...	...	...	...	...	...	...	...	1 (i)	1 (i)					
3	Blankets, barrack ... ,,	1	2	1	2	1	2	...	...	...	...					
4	,, country ... ,,	...	...	...	...	...	...	1	2	1	2					
5	Blouses, khaki ... ... ,,	...	...	...	...	...	...	...	...	1 (i)	1 (i)					
6	Boots, ammunition ... ,,	1 (c)	1 (c)	1	1	1 (j)	1 (j)	...	...	...	...					
7	,, ,, country made ,,	...	...	...	...	...	...	1 (k)	1 (k)	...	...					
8	Caps, balaclava (comforters in case of Sikhs) ... ,,	...	1	...	1	...	1	...	1	...	...					
9	Coats, warm ... ... ,,	1 (n)	1 (n)	1	1	1	1	...	(q)	1 (o)	1 (o)					
10	,, ,, followers ... ,,	...	...	...	...	...	...	...	...	...	1					

11	Coats, waterproof, with hoods		(d)	(d)	...	...			...	...	...	...	...	...					
12	Haversacks		...	...	...	...			...	...	...	...	1	...					
13	Jerseys		...	...	...	...			...	...	...	1	...	1					
14	Mittens ... ... Prs.		...	1	...	1	...	1	...	...	...	1	...	...					
15	Pyjamas, warm		...	...	...	...	...	...	...	...	...	1	...	1					
16	Pagris ... ... No.		...	...	...	...	...	...	...	...	...	...	1 (l)	1 (i)					
17	Putties ... ... Prs.		1 (e)	1 (e)	(f)	(f)	(f)	(f)	1 (p)	1 (p)	1	1		1					
18	Sheets, waterproof ... No.		1	1	1	1	1	1	1	1	1	1		1					
19	Shoes, country-made ... Prs.		...	...	...	...	...	...	(k)	(k)	1 (i)	1 (i)							
20	Socks, worsted		2 (l)	2 (l)	2	2	2 (l)	2 (l)	2	2	...	...							
21	Sun spectacles		1 (a)	1 (a)	1 (a)	1 (a)	1 (a)	1 (a)	...	...	...	...							
22	Sun-shades, khaki, for helmets ... ... No.		1 (a)	1 (a)	1 (a)	1 (a)	1 (a)	1 (a)	...	...	...	...							
23	Water-bottles, zinc		...	...	...	...	...	...	...	...	1	1							
													For free issues and renewals supplied by the S. and T. Telegraphs.	Renewals only, as follows:— Postmasters, inspectors, sub-postmasters and clerks.	Others.	Clerks, writers, munshis, interpreters, treasurers, agents, store-keepers, chowdries, assistants of the veterinary and stationery departments, sub-surveyors, khalasis and political orderlies (m).	Other establishments.		

(a) When considered necessary. (b) One pair of khaki cord pantaloons will be issued to each man of the military works services which will be renewed as required. (c) First issue to cavalry only. Renewals to all.

(d) 50 per regiment and 10 per battery in Sikkim or Burma only.

(e) First issue to horse and field artillery and mounted men of heavy batteries only. Renewals to all.

(f) Compensation in lieu of first issues will be paid.

(g) N.C.Os. of army and command headquarters attached to army or divisional headquarters are entitled to a water-bottle when proceeding on service. These articles will be replaced when renewal is ordered.

(h) Os.C. and all concerned are responsible that followers not entitled to a free issue of clothing are duly provided with it either by purchase, or by payment indent on S. and T. corps.

(i) Not to be issued to permanent followers who have these articles in possession.

(j) As renewals only. (k) Renewals only.

(l) As renewals only.

(m) European and Indian clerks, agents and store-keepers, hospital store-keepers, { who are not required to keep up boots or shoes as part of their equipment in peace time, should be provided with a pair of boots as a first issue at a cost to the State not exceeding Rs. 5 per pair.

All clerks and agents of the S. and T. corps and native clerks accompanying inspecting veterinary officers, or ordnance field parks, are entitled to a water-bottle, zinc, and haversack each, when proceeding on field service. European and Eurasian clerks of the S. and T. corps and medical department are entitled to two pairs of socks and all clerks and agents of the S. and T. corps, ordnance, medical and veterinary services, to one pair of putties each, when proceeding on field service. Each transport veterinary duffadar is entitled to a water-bottle, when proceeding on service. Renewals of all the above articles will be made as required.

(n) Not for mounted units who take cloaks or great-coats on service instead.

(o) For camel silladars only. (p) Renewals only.

(q) 23 per Indian mountain battery, half-squadron, or company.

INDIA.

FIELD ALLOWANCES OF BAGGAGE AND TENTAGE

Rank or Description.	Baggage. Summer.	Baggage. Winter.	Tentage.
British Officers (a)	lbs.	lbs.	lbs.
General Officers Commanding... ...	70	70	160
Officers with Headquarters and Officers Commanding Units... ..	70	70	40
Cavalry and Artillery	65	60	40
All others	60	60	40
British Troops.			
Cavalry—			
Warrant Officers	25	30	40
N.C.Os. and men	23½	23½	10
Artillery (ex-mountain batteries)—			
Warrant Officers	35	40	40
N.C.Os. and men	25(b	30	10
Infantry and Mountain Batteries—			
Warrant Officers	30	30	40
N.C.Os. and men	25½	23½	10
Indian Troops (c).			
Cavalry—			
N.C.Os and men	19½	24	[illegible]
Artillery (ex-mountain batteries)—			
N.C.Os. and men	29(d)	25(d)	8
Infantry, Mountain Batteries and Sappers and Miners—			
N.C.Os. and men	24½	24½	8
Followers—			
Public and private (e)	13½	13½	6

(a) Not provided by Government.
(b) 15 lbs. of which is carried on horse or battery vehicles.
(c) Tentage for all Indian officers 40 lbs., except cavalry 2 to a 45 lb. tent. Baggage 10 lbs. more than for N.C.Os. and men.
(d) 10 lbs. (5 for bullock drivers) of which is carried on horse or battery vehicles.
(e) Officers provide their private servants with shelter.

48. MEDICAL SERVICE.

1. The director of medical services is responsible for the medical and sanitary services of an army in the field. He receives his instructions through the A.G.'s branch of the staff.

2. With each division is an administrative medical officer and a medical and sanitary officer (assistant to A.M.O.).

3. The mobile medical units in the field are:—
The Field Ambulance, and the Cavalry Field Ambulance. (*See* Chapter I).

4. The remaining medical units are:—

Clearing Hospitals	200 sick.
Stationary "	200 beds.
General "	520 "
Convalescent Depôts	500 or 1,000 convalescents.
Ambulance Trains	100 lying down cases.
Hospital Ships	220 beds.

ii. Sanitation.

1. The field sanitation of units is under regimental control.
2. The unit provides 1 N.C.O., and men, according to the strength of the unit, for sanitary duties (see F.S. Manual for the various arms). These men have the supervision of excreta and refuse disposal, and act as sanitary police.
3. The R.A.M.C. provide the following:—

(a) A non-commissioned officer and men, as laid down in W.E. for water duties. These men receive special instruction in their duties, and will be concerned with the purification of water; they will also be available for duties in connection with disinfection and with the care of the sick. They have charge of the water carts and of any apparatus or chemicals that may be issued for sterilization of water.

4. On a L. of C., a sanitary squad is provided for each road or railway post, and two for each advanced depôt.
5. For each base and to each railhead a sanitary section is provided.
See page 11 for the personnel of sanitary sections and squads.
6. A sanitary committee of 3 senior officers act as a board for all sanitary problems on the L. of C., their function being to assist general officers and the medical service in their efforts to maintain the health of the army by co-ordinating the military and civil sanitary organizations of the area.

iii. Disposal of Casualties.

A wounded man is generally first attended to by the M.O. with his unit and (unless able to walk) is carried back by the regimental stretcher-bearers or bearers of the field ambulance to the dressing station, if one has been formed, or direct to the tent division of the field ambulance.

From the field ambulance he is transferred through a clearing hospital to a stationary or general hospital on the L. of C., when, if no further treatment is required, he is transferred to a convalescent depôt.

If the journey is by rail, he is ordinarily conveyed by an ambulance train. If sent to England, he proceeds in a hospital ship, thence he is transferred to a military hospital. Should he require no further active treatment, although still unfit for duty, he is transferred to a convalescent depôt; from this he may proceed on sick furlough or be discharged to duty.

iv. Medical Notes.

Normal pulse	72 per minute.
Normal respiration	15 to 18 "
Normal temperature	98·4° Fahr.

V. TREATMENT OF CASES OF EMERGENCY.

Bleeding :—

Bleeding may be either external or internal, and may be arterial, venous, or capillary.

1. Arterial (external).—The blood is of a bright red colour, and escapes in spurts.

Treatment.—(a) By pressure.

Expose the wound, apply the gauze of the first field dressing, and first try compression of the bleeding point with the fingers over this protection, or preferably by plugging the wound with a piece of antiseptic gauze; or press the main artery with the fingers between the wound and the heart. Pressure should be maintained until some more permanent means can be employed (such as an improvised tourniquet, see p. 192), or medical assistance procured.

(b) By application of heat or cold.

Hot water is best. Temperature of 140° to 160° Fahr., or rather hotter than the hand can comfortably bear. Warm water is useless. (This means of arresting bleeding is applicable to the smaller vessels.)

(c) By position of the patient.

Absolute rest is essential. If the bleeding is from a limb, raise it.

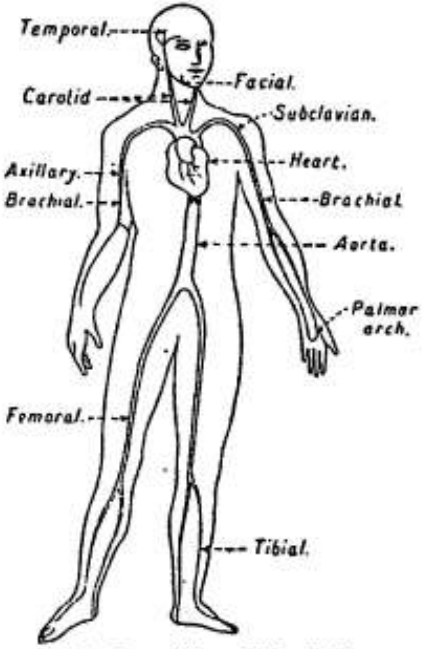


FIG. 1.—General Plan of Main Arteries.

2. The following table shows the situation of the main arteries and their treatment when wounded:—

Position (*see* Fig. 1).	Name of Artery.	Treatment.
Head	Temporal and Facial	Pad and bandage over the wound.
Neck (from inner end of collar-bone to angle of the jaw)	Carotid...	Pressure with the fingers in the wound on the mouths of the bleeding vessels.
Arm-pit	Axillary	(1) Compress sub clavian downwards and backwards behind the middle of the collar-bone; or (2), pressure with the fingers in the wound.
Arm (on inner side in line with the seam of the coat)	Brachial	Compress the artery by hand or tourniquet (*see* Fig. 2).
Palm of the hand ...	Palmar Arch	*Very difficult to treat.* Place a roll of bandage, a cork covered by any firm pad, in the hand and bandage the fingers tightly over it, bend up the arm from the elbow firmly, and, if necessary, apply pressure to the brachial artery, as in Fig. 2.
Thigh	Femoral	Pressure in the groin by fingers or tourniquet (*see* Fig. 3), or by fingers in the wound itself.

Fig. 2.—Digital Compression of the Brachial Artery (Best Method).

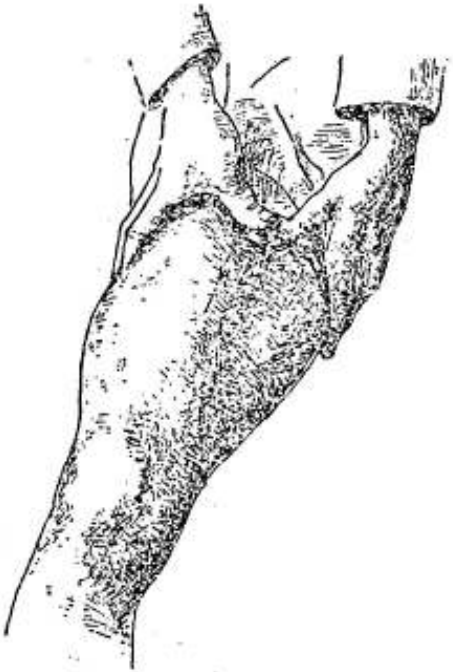


FIG. 3.—Digital Compression of the Femoral Artery.

3. An improvised tourniquet is an apparatus made upon the spur of the moment to represent a tourniquet, as follows:—Take a handkerchief, a smooth, rounded stone, and a stick, wrap up the stone in the centre of the handkerchief, tie a knot over it and place the stone over the artery, pass the ends of the handkerchief round the limb and tie them securely, leaving sufficient space for the stick to be admitted; pass the stick then between the handkerchief and the skin, and carefully twist it until by tightening the handkerchief the stone is pressed upon the artery with sufficient force to arrest the flow of blood. A pad should be placed between the stick and the skin to prevent the latter being bruised, and the end of the stick must be secured with a bandage to prevent the tourniquet untwisting.

Many other substitutes for the tourniquet may be adopted. Thus a tourniquet may be made out of a small square of cake tobacco and a puttee tape.

The tourniquet should be applied no tighter than is absolutely necessary to stop the arterial bleeding.

4. Venous (external).—The blood is of a dark colour, it flows or oozes out, but there is no appearance of pulsation.

Treatment.—Lay the patient down, remove any constriction which may be round the limb, elevate the limb, and apply a pad and firm bandage.

5. Capillary (external).—The blood oozes from the entire surface, not from any one point.

Treatment.—Bathe the part with cold water, or preferably with hot, as detailed for arterial hæmorrhage, and apply a pad and bandage firmly over the wound.

6. Internal bleeding.—The symptoms of internal hæmorrhage are prostration and weakness. The surface of the body is cold and the face pale, the lips lose their colour. The pulse is weak or imperceptible, there is sighing respiration and a cold clammy sweat.

Treatment:—

(a) Keep the patient absolutely quiet.
(b) Apply ice, if possible, and if the probable position of the bleeding is known.
(c) Do not give stimulants.

7. *Drowning.—Restoration by Schäfer's Method.*

If breathing has ceased, immediately on removal from the water, place the patient face downwards on the ground, with the arms drawn forward and the face turned to the side.

Then, without stopping to remove or loosen clothing, commence artificial respiration, as every instant of delay is serious.

To effect artificial respiration, put yourself astride, or on one side of the patient's body, in a kneeling or squatting position, facing his head. Placing your hands flat on the small of his back, with the thumbs parallel and nearly touching, and the fingers spread out over the lowest ribs, lean forward with the arms straight and steadily allow the weight of your body to fall on the wrists, and so produce a firm, downward pressure, which must not be violent, on the loins and lower part of the back. (Fig. 4.) This part of the operation should occupy the time necessary to count—slowly—one, two, three. By this means the air (and water, if there be any) is driven out of the patient's lungs. Water and slime from the air passages may also run out.

Immediately thereafter swing backward, rapidly releasing the pressure, when air will enter the lungs.

Do not lift the hands from the patient's body. (Fig. 5.) This part of the operation should occupy the time necessary to count—slowly—one, two. Repeat this forward and backward movement (pressure and relaxation of pressure) twelve or fifteen times a minute, without any marked pause between the movements.

In other words, sway your body forwards and backwards upon your hands, once in every 4 or 5 seconds.

Whilst the operator is carrying out artificial respiration, others may, if there be opportunity, busy themselves with applying hot flannels to the limbs and body, and hot bottles to the feet, or to promote circulation by friction, but no attempt should be made on the part of the operator to remove wet clothing, or give restoratives by the mouth, till natural breathing has recommenced.

When this has taken place, allow the patient to lie on the right side and apply friction over the surface of the body by using handkerchiefs, flannels, &c., rubbing legs, arms and body, all towards the heart, and continue after the patient has been wrapped in blankets or dry clothing. As soon as possible after complete recovery of respiration, remove patient to nearest shelter. On restoration, a

teaspoonful of warm water may be given, and if power of swallowing has returned, small quantities of wine, warm brandy and water, beef tea, or coffee. Encourage patient to sleep, but watch carefully for some time and allow free circulation of air round patient.

Fig. 4.—Expiration in Schäfer's Method.

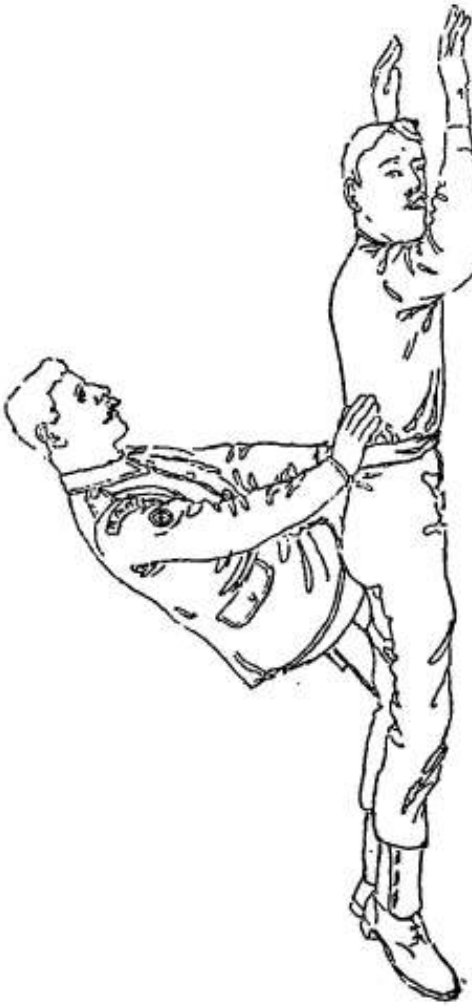


Fig. 5.—Inspiration in Schäfer's Method.

NOTE.—Artificial respiration must also be resorted to in case of suffocation in mining accidents, hanging, and lightning stroke, and severe electric shock.

8. *Snake Bite or Poisoned Wound:—*

Apply a ligature or tourniquet above the bite, *i.e.*, between it and the heart.

Make half-inch deep cruciform incision with a clean knife and rub in crystals or solution of permanganate of potash.

Give stimulants such as brandy, salvolatile and hot black coffee.

If breathing is bad, use artificial respiration.

9. *Stings of Venomous Insects:—*

Apply solution of ammonia or bi-carbonate of soda.

10. *Burns and Scalds:—*

Apply oil, vaseline, or boracic powder. Cover from air quickly. Cut clothes off, never pull them off.

11. *Shock, Loss of Consciousness, and Fits:—*

Shock:—

Restore warmth to the body.

Give hot drinks and stimulants if conscious.

Loss of Consciousness:—

Send for medical aid at once.

Lay patient on his back; if the face is flushed, keep the head high, if pale, keep it low.

Loosen all tight clothing round the body.

Give no food or drink unless under medical direction.

Allow plenty of fresh air to the patient.

Fainting:—

Lay patient on his back, with the head low.

Loosen clothing round the neck and chest.

Apply smelling salts to the nose.

Allow plenty of fresh air.

Fits (Epileptic):—

Lay patient on his back, with the head slightly raised.

Loosen the clothes about the neck and chest and prevent him from biting his tongue by placing the handle of a toothbrush, or similar article, as a gag between his teeth.

Employ sufficient restraint only to prevent him injuring himself.

Fits (Apoplectic):—

Raise and support the head and upper part of the chest.

Loosen clothes round neck, and apply cold water to head.

Do not give stimulants.

12. *Sunstroke or Heatstroke:—*

Place patient at once in shade or cool place.

Allow plenty of fresh air.

Raise head and remove clothing from neck and upper part of body.

Douche head, neck and spine, or whole body in cold water.

Do not give stimulants.

13. *Frost Bite:—*

Rub affected part with snow or cold water. Avoid taking the patient into a warm room until the part has been thoroughly, but very gradually, thawed. Do not apply heat in any form.

14. *Sore Feet:*—

Bathe the feet at night in tepid water with salt or alum in it.

Soap the socks before marching, or powder them inside with boracic powder.

For blisters, prick the edge with a needle, keep clean, and prevent the surface from being rubbed.

15. *Sprains:*—

Rest.

Cold or hot water applications; the latter gives most relief if there is much swelling.

16. *Wounds:*—

Stop the bleeding.

Do not attempt to clean up the wound on the field.

Apply a dressing.

In applying the Field Dressing (which is in the possession of every officer and man in the field), care should be taken to place it directly on the wound without in any way touching with the fingers either the wound or the surface of the dressing which comes in contact with the wound.

This may be done by taking hold of the dressing by pinching it up at the back, turning it inside out, and applying the fresh surface direct to the wound.

17. *Fractures:*—

Splints are required for the treatment of broken limbs. They are made of any unyielding substance, such as wood, bark, bundles of twigs, wire, rifles, bayonets, swords, &c. They should be padded with some soft material. They are bound to the limb with bandages, tapes, &c. Cases of suspected fracture should not be moved without first applying a splint.

18. *Poisoning:*—

Send at once for medical assistance. Two main principles must be borne in mind in treating such cases.

Try to remove the poison already taken, if possible or advisable.

Try to lessen the poisonous effects by giving the proper remedy, sometimes called an antidote. When an unknown poison has been swallowed give the following, which is harmless, and an antidote to many common and active poisons:—

Carbonate of Magnesia.
Powdered Charcoal.
Hydrated peroxide of iron. } Equal parts.

Administer freely in sufficient quantity of water.

Poisons are divided into:—

(a) Corrosive. (b) Irritant. (c) Systemic. (Constitutional).

Symptoms.—(a) Great pain, immediately after poison has been swallowed, in mouth and throat which look as if scalded. Lips stained and blistered. Shock, difficulty of breathing, and breath smells sour.

(b) Pain at first is not very marked, sensation of burning, pain gradually increases, and vomiting sets in with pain in the stomach, diarrhœa and exhaustion.

(c) No sign of burning redness or pain. May be giddiness, dimness of sight, drowsiness, difficulty of breathing, delirium, cramps and convulsions.

Give emetics, for example, mustard or salt, a tablespoonful to a tumbler of water in (b) and (c), but not in (a). An emetic promptly given may save patient's life.

In (a) give scrapings from white washed walls or ceilings, mixed with water.

In (c) after emetic, walk patient about and give hot coffee; if breathing fails, resort to artificial respiration.

49. REMOUNT SERVICE.

1. The director of remounts is responsible for the provision, administration, care, training and distribution of all animals, and receives instructions through the Q.M.G.'s branch of the staff.

2. Each unit will furnish:—

(a) On landing a return to the D.A.D.R. at base port showing number of horses, cobs and mules landed.

(b) Animal a/c (Army Form A 2004). The numbers landed will form the first entry of the monthly account to be rendered at the end of each month.

3. To replace casualties in field units indents will be sent by commanders to the commander of the nearest remount depôt of the division or formation to which the unit belongs. A duplicate will be rendered to divisional headquarters.

4. Sick horses and other casualties will be sent by units to the nearest veterinary hospital, and when reported fit for duty will be transferred to the nearest remount depôt for issue to units.

5. Cold shoeing will be invariably adopted in the field. No charge will be made for shoeing public animals.

6. All riding, draught or pack animals, taken in action, brought in by deserters, or otherwise obtained, will, if serviceable, and after being certified by a Veterinary Officer as free from contagious disease, be handed over to the nearest unit requiring them, the commander of which will report the transaction to the O.C. the nearest remount depôt, who will take them on the strength of his depôt and strike them off as issued to the unit or units concerned.

7. If practicable, a receipt showing descriptive numbers, &c., will be obtained by the person handing them over. If unserviceable they will be destroyed.

50. VETERINARY SERVICE.

The veterinary service in war is under a director of veterinary services, who receives instructions from the Q.M.G.'s branch of the staff. Under him are administrative and other veterinary officers.

VETERINARY HINTS FOR COMMON AILMENTS AND INJURIES WHEN VETERINARY ADVICE IS NOT AVAILABLE.

Ailment or Injury.	Symptoms, Treatment, &c.
1. *Skin.*	
(a) Ringworm ...	Symptoms. Hair falls out in circular patches. Treatment. Clip affected parts and burn clippings. Wash animal all over with some disinfectant (*i.e.*, cresol, 1 part to 80 of water). Apply tincture of iodine, if available, paraffin or soft soap to spots. Disinfect harness, &c.
(b) Mange ...	Symptoms. Marked skin irritation. Horse bites and rubs himself against any available object. Hair comes off in patches and skin becomes thickened and corrugated.

VETERINARY HINTS—*continued.*

Ailment or Injury.	Symptoms, Treatment, &c.
Mange—*cont.*	
	Prevention of spread. Obtain veterinary aid without delay. Very contagious. Isolate affected and suspicious cases with their equipment. Men looking after them should not go amongst healthy animals, as they may carry infection in their clothing. Thoroughly disinfect all stables, utensils, harness, &c. Discontinue clothing. Picket in open. Change standings.
	Treatment. Clip, burn clippings, dress all over with a mixture of paraffin 1 pint, soap 1 lb. and water 1 gallon. Regular exercise and dress immediately on return every 3rd day. If horses urgently required, make up troop of affected animals to work by themselves. Contagious to man; suspect any rash.
(c) Ticks	Treatment. Pull out, taking care not to leave head in the skin; or touch with paraffin, turpentine or carbolic acid.
2. *Legs.*	
(a) Sprain tendons, &c.	Treatment. Rest. Apply cotton wool and linen bandage and stand in cold water; or apply layer of soft clay 1" thick. Renew when dry.
(b) Heel rope galls	Prevention. Keep head rope short. Treatment. Grease when marching. On return to camp wash with soap and warm water, thoroughly dry and apply dry bran poultice.
(c) Cracked heels and mud fever.	Prevention. Do not wash legs when muddy, but leave until dry and then brush dirt out. Treatment. Cleanse and dry (if greasy apply dry bran poultice), dust on boric acid or powdered starch.
3. *Feet.*	
(a) Thrush ...	Treatment. Clean frog, dress cleft with boric acid and then plug with piece of tow. If severe, poultice or soak foot before applying dressing. Stand on driest ground available. Shoe with tips.
4. *Dirty Sheath.*	Treatment. Draw out penis and wash it and sheath with soap and warm water or dirt will accumulate and maggots may appear.

VETERINARY HINTS—*continued.*

Ailment or Injury.	Symptoms, Treatment, &c.
5. *Wounds.*	
(a) Bullet ...	Treatment. Observe cleanliness in the treatment of all wounds. Dust with boric acid and cover with clean pad of lint, wool or tow and bandage, which must not be applied tightly unless to stop bleeding.
(b) Broken knees	Treatment. Do not poultice. Clean with cold water and treat as for (a).
(c) Cuts and tears	Treatment. As for (a and b).
(d) Bit injuries	Treatment. Work in snaffle or with bridle over nose; improvise martingale, if necessary. Rinse mouth with clean water after feeding.
6. *Galls.*	
(a) Girth	Treatment. If simply a swelling, lightly smooth over the swollen surface with the hand in the direction of the hair, as if to smooth it out, for 15 minutes at a time. If skin is chafed treat as for wounds. To work horse, strap girth back, tying it under the belly to surcingle, which should be placed over fans of saddle. When healed, place piece of sheepskin under girth.
(b) Sore backs and saddle galls.	Prevention. Careful supervision and fitting of saddlery. Treatment. If swelling only, treat as at (a) or bathe with cold salt water. If skin chafed, treat as for wounds. Keep saddle off back until healed.
(c) Sore withers	Treatment. Keep arch of saddle well clear of withers. If swelling only bathe with cold salt water. If skin broken, treat as for wounds.
7. *General System.*	
(a) Coughs and colds	Any animal with a nasal discharge should be isolated and veterinary aid obtained as soon as possible. Treatment. Steam head and apply liniment, or mustard mixed as for the table, to throat from ear to ear and leave on for 15 minutes. Give soft food. Keep body warm with rugs and bandages and give plenty of fresh air.
(b) Fever	Symptoms. Horse off feed, dull temperature over 100° F. Treatment. Isolate and apply for veterinary aid. Give soft food, and green stuff when available. Keep water always by and change frequently.

VETERINARY HINTS—*continued.*

Ailment or Injury.	Symptoms, Treatment, &c.
Fever—*cont*	If procurable, give a handful of Epsom Salts in each bucket of water. Keep body warm with rugs and bandages and give plenty of fresh air.
(c) Exhaustion after hard work.	Treatment. Give pint of warm beer, or half tumbler of rum or whiskey in a pint of water. Rug up and bandage. Rest and light exercise. Feed with bran mashes, steamed oats, boiled linseed, oatmeal gruel, &c., if available, in small quantities and often.
(d) Colic	Symptoms. Horse looks round at his sides, tries to lie down and roll, stamps with hind legs and kicks at belly. Treatment. Walk about, give chloral hydrate ball, if available, or 2 ozs. turpentine well shaken up, either with a pint of linseed oil or eggs and milk. If not relieved in an hour repeat the dose and give in addition an aloes ball. In the absence of drugs give half tumbler of rum or whiskey in a pint of warm water; or 1½ pints of warm beer with a teaspoonful of ginger mixed in it. Hand rub belly and give frequent enemas of soapy water. A large bottle with the bottom knocked out makes a useful enema funnel.
(e) Sand Colic ...	Prevention. Feed off blankets, &c. Clean food. Treatment. Give chloral hydrate balls and linseed oil.
(f) Constipation	Treatment. Soft food and green also, if available, regular work and frequent enemas.
(g) Diarrhœa ...	Treatment. Dry bran. Keep body warm with rugs and bandages.
8. *Specific Diseases.*	
(a) Stranglers ...	Symptoms. Swelling at the back of or under the jaw. May be some difficulty in swallowing. Treatment. Isolate and obtain veterinary aid. Rest, soft food, rug up and bandage, plenty of fresh air and foment swelling. When swelling bursts treat as for wounds.
(b) Glanders ...	Symptoms. Thick, gluey discharge from one or both nostrils, ulcers on the membrane, inside nostrils, glands between lower jaws enlarged, hard and appear to be fixed to bone.

VETERINARY HINTS—*continued.*

	Symptoms, Treatment, &c.
Glanders—*cont.*	
	Treatment. Very contagious. Rigid isolation of affected cases, in-contacts and whole unit, if possible. On suspicion immediately obtain veterinary aid. Very contagious to man.
(*c*) Farcy	Symptoms. Skin form of glanders. Appears as a string of running sores, usually on inside of hind legs, occasionally neck and face. No tendency to heal. Treatment. As for glanders.
(*d*) Epizootic Lymphangitis.	Symptoms. Sores similar to and in similar situations to farcy. They have a greater tendency to heal. Usually originates from a wound, from which point cord-like swellings appear, and on the course of which these sores form. Treatment. Very contagious. Proceed as for farcy.
(9) *How to make:—*	
(*a*) Bran mash ...	Put 2 double handfuls of bran in a bucket and pour on as much boiling water as the bran will soak up. Cover bucket with rug and leave till cool enough to eat. Teaspoonful of salt improves.
(*b*) Steamed oats ...	Substitute oats for bran and proceed as above.
(*c*) Gruel	Cook oatmeal as for porridge and thin down with water or may mix oatmeal with water straight away.
10. *How to shoot a horse.*	Lift up forelock and place it under brow band. Place muzzle of revolver almost touching the skin where the lowest hairs of the forelock grow.

CHAPTER VIII.

51. CORRESPONDENCE.

1. General Rules.

1. Office work in the field is to be restricted to what is absolutely indispensable.

2. Equipment accounts will not be kept by units, other than those of A.O.C.

3. Papers, except those required for reference, will be sent to the base record office or destroyed. Those which it is necessary to keep with the unit will be marked "K," those for the record office "R."

4. A *state* is a means whereby a commander is kept informed of the fighting condition of his command. Punctuality in rendering it is usually more important than extreme accuracy. The Field State (A.F. B 231) is shown on next page.

5. A *return* is a document for statistical purpose, or to show the condition of the forces more accurately than is possible in a state. Accuracy in their compilation is essential. The Field Return (A.F. B 213) is furnished weekly on Sunday to base record office.

6. An officer, in whose custody are secret or confidential books, etc., is responsible for taking precautions to prevent their falling into the hands of the enemy.

7. Letters in the field should be drawn up in minute form. The same rules should be applied to them as have been given in Section 13 for orders and messages.

Unit _____

Place _____

Date _____

Army Form B 231.

FIELD STATE.

To be rendered in accordance with Field Service Regulations, Part II.

Unit.	Fighting Strength (This should not include attached details, 2nd line transport, details who march with 2nd line transport, or any men unfit to fight.							Ration Strength (To include fighting strength attached details, 2nd line transport and all personnel and animals attached for rations and forage).			
	Personnel		Horses and Mules		Guns and ammunition wagons (stating nature)	Machine guns	Remarks	Personnel	Horses and Mules		Remarks
	Officers	Other Ranks	Riding	Draught and pack				Total all ranks entitled to rations.	Heavy horses with R.G.A.	Other horses and mules	
Totals ...											

Ammunition with unit:—

·303-inch; approximate number of rounds per man _____

·303-inch; " " " " machine gun _____

Gun or howitzer; approximate number of rounds per gun howitzer _____

Supplies with unit:—

Approximate number of days' rations for men of ration strength _____

Approximate number of days' forage for animals of ration strength _____

(Signature of Commander) _____

ii. War Diaries.

1. War Diaries are confidential documents. Their object is:—
   (a) To furnish an accurate record of the operations from which the history of the war can subsequently be prepared.
   (b) To collect information for future reference with a view to effecting improvements in the organization, education, training, equipment and administration of the army for war.

2. A diary will be kept in duplicate by:—
   Each branch of the staff at general headquarters, and at the headquarters of an army, and of all subordinate commands, including garrisons and posts, except intelligence sections of the general staff.
   Commanders of permanent and provisional units, detachments from a unit, and base depôts, and the officer i/c base record office.
   Directors and heads of administrative services and departments, and their representatives, and officers holding special and personal appointments, from the first day of mobilization or creation of the particular command or appointment.
   The original copy will be forwarded on the last day of each month, unless otherwise ordered, direct to the officer i/c base record office concerned, for transmission to the War Office.

3. The fact that a diary is kept and transmitted periodically in no way relieves an officer of the duty of at once reporting to all concerned information he may receive, or important action he may take.

4. A diary will contain a concise and accurate record in narrative form of all important events which may occur from the point of view of the section of a staff, service or department, post, or unit concerned. All important orders received and the action taken will be mentioned.

5. All information obtained as to the enemy's plans and movements and the topography of the theatre of operations will be recorded. The time when such information was first obtained and received and the source of information will be specified.

6. In so far as a unit or department is directly concerned, it will contain medical, sanitary, and meteorological reports and information as to the state of works, supplies, transport, stores, animals, etc. At posts on the lines of communication, all arrivals and departures will be noted.

7. Reports of subordinate commanders and others, reconnaissance reports, sketches, departmental reports and tabular statements, should be added in the form of appendices.

8. The original copy will be forwarded on the last day of each month, unless otherwise ordered, direct to the officer i/c base record office concerned.

iii. Intelligence Diaries

1. Intelligence diaries are secret documents compiled by the sections of the general staff responsible for intelligence duties. The subjects with which they deal are:—
   (a) Provision of guides and interpreters.
   (b) Acquisition and distribution of information about the enemy, the country, its climate and resources.
   (c) Correspondence with the enemy.
   (d) Secret services, ciphers, care and disposal of captured documents.
   (e) Revision of maps.

Intelligence diaries are intended primarily to be a record to assist the work of the general staff in the field and should contain any information on the above subjects which would serve this use. They will also be of value in compiling the subsequent history of the war. Instructions as to their disposal will be issued from general headquarters.

iv. Ciphers.

1. A cipher system for use in the field should conform to the following conditions:—

(a) It must be comparatively secure, *i.e.*, it should necessitate considerable trouble to decipher without a knowledge of the key word.
(b) It must not require written notes for its use.
(c) The keyword must be easy to remember, easy to spell, and should contain as many different letters as possible.
(d) The keyword must be necessary, even when the system is known.
(e) The method of enciphering and deciphering must be simple.

2. The following instructions should be observed in enciphering or deciphering messages:—

(a) No cipher message should ever contain paragraphs partly in clear and partly in cipher.
(b) Ciphers or deciphers should never be written on the same sheet of paper as the original message.
(c) Every cipher message should be checked before despatch.
(d) References to cipher messages should be avoided in ordinary correspondence.
(e) Cipher messages should be arranged in groups of five letters.
(f) Enciphering and deciphering should be done in a mechanical manner, *i.e.*, no attempt to guess should be made.
(g) All papers used in the process of enciphering or deciphering must be destroyed. If records are necessary, a paraphrase should be made unless the exact wording of a particular sentence appears to be specially important. Such records should be marked with the letter P.

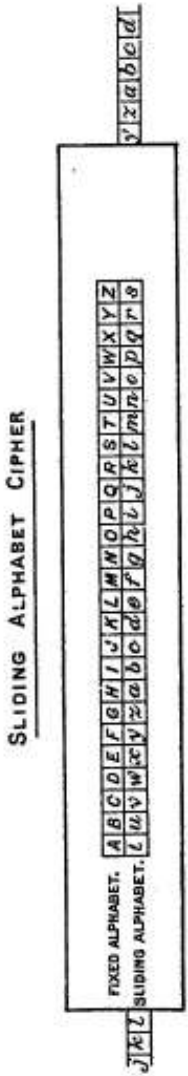
3. The Sliding Alphabet and Playfair ciphers are simple and comparatively secure. They belong to what are known as Substitution Ciphers.

v. *The Sliding Alphabet Cipher.* (*Plate* 17.)

1. In order to use the cipher, each correspondent requires a fixed and sliding alphabet. The sliding alphabet contains the alphabet twice over, so that, whatever the position of the sliding alphabet, there will always be some letter of this alphabet under each letter of the fixed alphabet.

2. An easily-remembered keyword is chosen, and the letters of the text written out in as many columns as there are letters in the keyword. For instance, if the keyword agreed upon were "Thames," and that the message to be sent were "Great

Plate 17.



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activity in arsenal here," the letters would be written out in six columns, thus*:—

G	R	E	A	T	A
C	T	I	V	I	T
Y	I	N	A	R	S
E	N	A	L	H	E
R	E				

3. Next, the first letter of the keyword, "T," in the sliding alphabet is brought under the A of the fixed alphabet, and the first column of letters is enciphered, each letter being looked up in the sliding alphabet and represented in cipher by the letter standing immediately above it in the fixed alphabet. The second letter of the keyword is then brought under the A of the fixed alphabet, and the second column of letters is similarly enciphered, and the same procedure followed with the remaining columns of letters. Each column of letters is thus enciphered by a different alphabet, and the number of alphabets used corresponds to the number of different letters in the keyword.

4. The above columns would be represented in cipher thus:—

N	K	E	O	P	I
J	M	I	J	E	B
F	B	N	O	N	A
L	G	A	Z	D	M
Y	X				

and the cryptogram, arranged in groups of five letters, would read as follows:—

NKEOP IJMIJ EBFBN ONALG AZDMY X

5. The above cipher may be varied as follows:—

The letters of the text form the key letters, each letter being enciphered by using the letter immediately before or after it. For instance, if the preceding letter is to be taken as the key letter, and the words "Great activity" are to be enciphered, the 1st letter "g" remains the same in cipher, the 2nd letter "r" is enciphered by using the 1st letter "g" as the key letter, the 3rd letter "e" by the aid of the 2nd letter "r," and so on.

6. In order to decipher the cryptogram, the receiver writes the letters out in the same number of columns as there are letters in the keyword, and then, by reversing the process employed when enciphering, finds the true letters represented by the letters of each column successively.

vi. *Playfair Cipher.*

1. According to this system the letters of the text are enciphered in pairs, and one letter of a pair is represented in cipher by the same letter only when the other letter of the pair remains the same. This fact greatly increases the difficulty of solution,

* With practice in the use of this cipher, it will be unnecessary to actually write out the letters of the message in columns, as it will suffice to tick off the letters in groups of six, thus: Great a [ctivit [y in ars [enal he [re. Writing the letters in columns is recommended, however, for beginners, as it does not take long and reduces the possibility of mistakes.

and messages so enciphered, if not actually insoluble, would as a rule cause sufficient delay to prevent the enemy from deriving advantage from the solution.

Example.

Keyword—"Soldier."

S	O	L	D	I
E	R	A	B	C
F	G	H	K	M
N	P	Q	T	U
V	W	X	Y	Z

2. The method of using the Playfair system is as follows:—

Construct a square, containing 25 spaces,* and inscribe first the letters of the keyword, omitting repetitions, and then the remaining letters of the alphabet.

There are other ways of inscribing the letters of the alphabet in the table, in order to avoid the constant occurrence of the less frequently used letters, in the last line of the table. For instance, the last 5 letters may be written along a diagonal, or all the letters may be written in alternate squares, or in every third square, until the alphabet is completed.

3. To encipher the message the letters are taken in pairs, and equivalents are found for each pair of letters. A pair of letters must occur:—

(a) In the same vertical column.
(b) In the same horizontal line.
(c) At opposite angles of some rectangle.

In the first case each letter is represented in cipher by that which stands below it, and the bottom letter by the top one of the same column, *e.g.*, F V would be represented by N S.

In the second case each letter would be represented by the letter on its right and in the same line, and the letter on the extreme right by that on the extreme left, *e.g.*, R C would be represented by A E.

In the third case the two letters are represented by those on the other diagonal of the rectangle, each by that which is in the same horizontal line, *e.g.*, S G would be represented by O F.

* By using K for both K and Q a rectangle of 24 spaces can be employed instead of a square of 25, and this variation is often introduced in French cipher systems, in which language K seldom occurs.

4. If, on dividing the letters of the text into pairs, a pair is found to be composed of a double letter, a dummy letter such as Q. X. Y or Z. which is not likely to mislead the receiver of the message, should be introduced, care being taken that the dummy letter employed is constantly varied.

If the message contains an uneven number of letters, a dummy letter should be added to complete a pair.

5. *Example.*—If the message—"Enemy attacked at noon and were repulsed"—were to be enciphered with keyword "Soldier" (*vide* preceding table), the letters would be divided into pairs as follows:—

EN—EM—YA—TY—TA—CK—ED—AT—
NO—ON—AN—DW—ER—ER—EP—UL—
SE—DE—ND—SX.

The pairs of letters would then be enciphered thus:—

FV—CF—XB—YD—QB—BM—BS—BQ—PS—SP—
EQ—OY—RA—RA—RN—QI—EF—SB—TS—LV.

The cryptogram, when grouped for transmission by telegraph or signalling, would be:—

FVCFX—BYDQB—BMBSB—QPSSP—EQOYR—ARARN
QIEFL—THVSV.

6. In order to decipher the cryptogram, the receiver divides it into pairs, and from his table finds the equivalents for each pair; taking the letters next above each when they are in the same vertical column, those next on the left when they are in the same horizontal column, or those at the opposite angles of the rectangle.

52. DISCIPLINE.

On active service the G.O.C. in C. and any general officer he may appoint, may reduce any N.C.O. to any lower grade or to the ranks.

POWERS OF A COMMANDING OFFICER.

Detention up to 28 days (28 days for absence without leave). Fines for drunkenness. Stoppages (*see* Sect. 133 A.A.). Confinement to barracks or camp up to 14 days. Extra guards and piquets. Field punishment for a period not exceeding 28 days. Forfeiture of ordinary pay for a period not exceeding 28 days, commencing on the day of sentence (on active service only).	Applicable to private soldiers.
Admonition. Pay is forfeited for absence without leave by Royal Warrant for Pay.	Applicable to both private soldiers and N.C.O.'s.
Severe reprimand, reprimand or admonition	Applicable to N.C.O.'s.

INDIA.

A N.C.O. may be summarily reduced by the C.-in-C. in India, by the O.C. an army, division or brigade or (on active service) by the O.C. the forces in the field.

POWERS OF A COMMANDING OFFICER.

Imprisonment (rigorous or simple) up to 28 days (a C.O. under field rank is restricted to 7 days).

Extra guards and piquets.

Confinement to lines up to 28 days

Deprivation of acting rank, etc.

Forfeiture of one rate of g.s. or g.c. pay.

Reprimand or severe reprimand (W.Os. and N.C.Os. only).

Fine up to 7 days pay a month (non-combatants, except W.Os).

Stoppages as authorized by I.A. A 50 (*f*).

N.B.—Imprisonment and confinement to lines are only awardable to persons below the rank of N.C.O. "Rigorous" imprisonment is equivalent to imprisonment with H.L.

53. COURTS-MARTIAL.

Name of Court-Martial.	No. of Members	Service of Members, Minimum.	President, Rank of.	Powers, Maximum.	Convening Authority.
General... ...	U.K., India, Malta, and Gibraltar 9, elsewhere 5	3 years	F.O. (Colonel, if possible)	Death, and all lesser punishments	H.M., or G.O.C. by warrant.
District	3	2 years	F.O., but if a F.O. is not available, a Captain may sit	2 years I.H.L. Reduction of N.C.O. Discharge	G.O.C. or other officer having a warrant to convene A.D.C.M
Regimental ...	3	1 year	Captain	42 days' Detention.	G.O.C., or C.O.
Field General...	3	...	Same as for a D.C.M.	Same as G.C.M. (unless less than 3 members)	O.C. Det. on service where G.C.M. not possible, or no superior authority.

Officers can only be tried by G.C.M. or F.G.C.M.

N.C.O.'s above rank of corporal are not to be tried by any court inferior to a D.C.M. except when a D.C.M. or higher court cannot, having due regard to the public service, be assembled.

Any Court-martial may award field punishment for any offence committed on active service, and may, in addition to or without further punishment, sentence an offender to forfeiture of pay for a period not exceeding three months commencing on the day of sentence.

Name of Court-Martial.	Number of Members.	Description of Members.	Maximum Powers.	Convening Authority.
General	7, or 5 if convening order states that 7 are not available.	All B.Os. or all N.Os but not mixed. Accused may claim trial by B.Os. No restrictions as to rank of president or service of members.	Death.	C.-in-C. in India or officer empowered by warrant of C.-in-C. in India.
District	3.	Ditto.	2 years rigorous imprisonment.	Officer empowered to convene a G.C.M. or officer holding D.C.M. warrant from him.
Summary	C.O. *alone* constitutes the Court, but it must be attended by 2 other officers.	———	*If held by C.O. a "corps"*—1 year's rigorous imprisonment. *If held by C.O. a detachment* — 6 months' rigorous imprisonment.	No convening officer—power is inherent in C.O.
Summary—General	5.	B.Os., N.Os. or mixed. Accused cannot claim trial by B.Os. No restrictions as to rank of president or service of members.	Death.	(a) Officer empowered by G.O.-in-C. or C.-in-C. (b) O.C. Forces in the Field or Officer empowered by him (c) O.C. Detached portion of H.M. Forces on active service when G.C.M. not possible.

Officers can only be tried by G.C.M. or S.G.C.M.
W.Os. cannot be tried by S.C.M.
Corporal punishment up to 30 lashes can be awarded, on active service, to any offender under rank of W.O. for any offence, by any Court-Martial competent to try him. It is inflicted with the regulation cat on the bare back.

FORMS OF CHARGES FOR COURTS-MARTIAL WHICH MAY OCCUR ON ACTIVE SERVICE ARE SHOWN BELOW.

Commencement of Charge Sheet.

The accused [*number, rank, name, battalion, regiment*] a soldier [officer] of the regular forces,

or,

The accused [*rank, name*] an officer of the regular forces on the active list on half-pay,

or,

The accused [*rank, name*] retired pay [*or* pensioner, *or* reservist] employed on military service under the orders of an officer of the regular forces,

or,

The accused [*rank, name*] an officer of the reserve of officers ordered on duty (or service),

or,

The accused [*rank, name, corps (if any)*] an officer of the special reserve of officers,

or,

The accused [*rank, name, corps*] an officer of the territorial force,

or,

The accused [*number, rank, name, battalion, regiment*] a soldier of the territorial force out for training [*or otherwise subject to military law*],

or,

The accused [*rank, name, regiment*] an officer of the militia [or an officer of the yeomanry commissioned since the 16th day of August, 1901],

or,

The accused [*rank, name*] an officer of the volunteer battalion of the regiment [or an officer of the yeomanry commissioned before the 17th day of August, 1901], whose corps is on actual military service [*or who is otherwise subject to military law*],

or,

The accused [*rank, name, corps*] an officer [a soldier] of a colonial force raised by order of His Majesty, and serving under the orders of an officer of the regular forces,

or,

The accused [*name*] being a person subject to military law as an officer [under the provisions of s. 175 (7) [*or* (8)] of the Army Act],

or,

The accused [*number, rank, name*] a militiaman [*or* yeoman] of the battalion regiment, out for training [*or* embodied] [*or otherwise subject to military law*],

or,

The accused [*number, rank, name, corps*] of the volunteer force of the United Kingdom, attached to the regular forces [*or otherwise subject to military law*],

or,

The accused [*name*] a follower [sutler] of His Majesty's forces being subject to military law as a soldier [under the provisions of s. 175 (9) [or (10)] of the Army Act],

is charged with—

Where the offence has been committed by a person while subject to military law, and he has ceased to be so subject at the

time when he is charged (in accordance with the provisions of s. 158 of the Army Act); as, for example, if a soldier has been transferred to the reserve, or discharged, or if the training period of a militiaman or yeoman has expired, the commencement of the charge will run as follows:—

The accused [*name*] is charged with having, while being [*number, rank*] of the battalion, regiment, [a soldier of the regular forces] [*or otherwise subject to military law*] committed the following offence [offences], namely,

or,

The accused [*name*] is charged with having, while being [*number, rank*] of the battalion, regiment, a militiaman [*or* yeoman] out for training [*or otherwise subject to military law*] committed the following offence [offences], namely,

(Offences.)

Sec. 4 (1). 1. Shamefully delivering up a garrison in that he on the (date) when in command of the troops at (place), without due necessity, delivered up the garrison of that place to the enemy. Maximum punishment—Death.

Sec. 4 (2). 2. *Shamefully casting away his arms in the presence of the enemy. Maximum punishment—Death.*

Sec. 4 (7). 3. *Misbehaving before the enemy in such a manner as to show cowardice. Maximum punishment—Death.*

Sec. 5 (1). 4. *When on active service, without orders from his superior officer, leaving the ranks on pretence of taking wounded men to the rear. Maximum punishment—Penal Servitude.*

Sec. 5 (2). 5. *When on active service, wilfully destroying property without orders from his superior officer. Maximum punishment—Penal Servitude.*

Sec. 6 (1c). 6. *When on active service leaving his commanding officer to go in search of plunder. Maximum punishment—Death.*

Sec. 6 (1e). 7. *When on active service forcing a safeguard. Maximum punishment—Death.*

Sec. 6 (1d). 8. *When on active service forcing a soldier when acting as sentinel. Maximum punishment—Death.*

Sec. 6 (1f). 9. *When on active service doing violence to a person bringing provisions to the forces. Maximum punishment—Death.*

Sec. 6 (1f). 10. The accused, A.B., sutler, being subject to military law as a soldier by reason of accompanying His Majesty's troops on active service, is charged with—

When on active service committing an offence against the person of a resident in the country in which he was serving. (Soldiers also can be tried under this section.) Maximum punishment—Death.

Sec. 6 (1g). 11. *When on active service breaking into a house in search of plunder. Maximum punishment—Death.*

Sec. 6 (1h). 12. *When on active service by discharging fire-arms intentionally occasioning false alarms on the march. Maximum punishment—Death.*

Note.—If there is a doubt as to whether the discharge of the rifle was intentional, a charge similar to No. 14 can be added as an alternative in the same charge sheet.

13. *When a soldier acting as sentinel on active service sleeping on his post. Maximum punishment—Death.* Sec. 6 (1).

14. *By discharging fire-arms negligently occasioning false alarms in camp. Maximum punishment—Cashiering or Imprisonment.* Sec. 6 (2a).

15. The accused, No. , Sergeant , Battalion, Regiment, a soldier of the Regular Forces, is charged with—

Causing a mutiny in forces belonging to His Majesty's Regular Forces. Maximum punishment—Death. First charge Sec. 7 (1).

Endeavouring to persuade persons in His Majesty's Regular Forces to join in a mutiny. Maximum punishment—Death. Second charge Sec. 7 (2b).

(Joint Trial.)

16. *The accused persons, No. , Private, Battalion, Regiment, and No. , Private Battalion, Regiment, soldiers of the Regular Forces, are charged with— Sec. 7 (3a)

†*Joining in a mutiny in forces belonging to His Majesty's Regular Forces. Maximum punishment—Death.*

17. *The accused, Bombardier Royal Artillery, a soldier of the Regular Forces, is charged with— Sec. 7 (4).

After coming to the knowledge of an intended mutiny in forces belonging to His Majesty's Regular Forces, failing to inform without delay his commanding officer of the same. Maximum punishment—Death.

18. *The accused, No. , Private Battalion, Regiment, a soldier of the Regular Forces, is charged with— Sec. 8 (1).

Striking his superior officer, being in the execution of his office. Maximum punishment—Death.

19. *When on active service offering violence to his superior officer. Maximum punishment—Penal Servitude.* Sec. 8 (2a).

20. *When on active service using threatening language to his superior officer. Maximum punishment—Penal Servitude.* Sec. 8 (2b).

21. **Disobeying, in such a manner as to show a wilful defiance of authority, a lawful command given personally by his superior officer, in the execution of his office. Maximum punishment—Death.* Sec. 9 (1).

22. *When on active service, disobeying a lawful command given by his superior officer. Maximum punishment—Penal Servitude.* Sec. 9 (2).

23. *The accused, Captain , Battalion, Regiment, an officer of the Regular Forces, is charged with— Sec. 10 (1).

When concerned in a quarrel, refusing to obey an officer who ordered him into arrest. Maximum punishment—Cashiering.

* Equally applicable in peace and war.
† Equally applicable in the case of a single person.

Sec. 10 (2). 24. *The accused, No. , Corporal , Dragoons, a soldier of the Regular Forces, is charged with—
Striking a person in whose custody he was placed. Maximum punishment—Imprisonment. (Officer cashiering.)

Sec 12 (a). 25. The accused, No. , Private , Battalion, Regiment, a soldier of the Regular Forces, is charged with—
When on active service, deserting His Majesty's Service. Maximum punishment—Death.

Sec. 12 (1a). 26. *When on active service, attempting to desert His Majesty's Service. Maximum punishment—Death.*
Note.—In the two preceding charges, if the soldier was under orders for active service, the charge will be the same, with the substitution of "under orders for active service" for "on active service."

Sec. 12 (1c). 27. *When under orders for active service, deserting His Majesty's Service. Maximum punishment—Death.*

Sec. 13. 28. **Fraudulent enlistment. Maximum punishment—First offence, Imprisonment; Second or subsequent offence, Penal Servitude.*

Sec. 14 (1). 29. **Assisting a person subject to Military Law to desert His Majesty's Service. Maximum punishment—Imprisonment.*

Sec. 16. 30. *The accused, Lieutenant , Regiment, an officer of the Regular Forces, is charged with—
Behaving in a scandalous manner unbecoming the character of an officer and a gentleman. Punishment—Cashiering.

Sec. 17. 31. *The accused, Captain , Battalion, Regiment, an officer of the Regular Forces, is charged with—
When charged with the care of public money, embezzling the same. Maximum punishment—Penal Servitude.
Note.—The particulars should state the acts which are alleged to have been committed by the accused and to amount to embezzlement.

Sec. 17. 32. *The accused, Quartermaster , Royal Army Medical Corps, an officer of the Regular Forces, is charged with—
When charged with the care of public goods, fraudulently misapplying the same. Maximum punishment—Penal Servitude.

Sec. 18 (2a) 33. *Wilfully maiming himself with intent thereby to render himself unfit for service. Maximum punishment—Imprisonment.*

Sec. 19. 34. The accused, No. , Private , Battalion, Regiment, a soldier of the Regular Forces, is charged with—
When on active service, drunkenness. Maximum punishment—Imprisonment. (Officer cashiering.)
Note.—If a soldier was on special duty, *e.g.*, parade or piquet, that special duty should be stated, or if he were on the line of march the fact should likewise be stated.

Sec. 41. 35. *When on active service, committing the offence of murder. Maximum punishment—Death.*

* Equally applicable in peace and war.

Each charge continues as in the following example (see No 1[a] above)—"in that he, at , on ;
and then follow the particulars, for instance, "struck with his fist in the face Serjeant X., who was at the time in command of an escort taking accused persons to the guard room." (See also above, 1st charge.)

Note.—In order to enable a court-martial to award field punishment it is essential to allege "when on active service."

FIELD PUNISHMENT.

Two Sorts.—No. 1 and No. 2.

No. 1. The offender may, unless the Court-Martial or C.O. otherwise directs—

(a) Be kept in irons.
(b) Be attached by straps, irons or ropes for not more than 2 hours in one day to a fixed object. Must not be attached for more than 3 out of 4 consecutive days or for more than 21 days in all.
(c) Be made to labour as if he were undergoing imprisonment with hard labour.

No. 2. Same as No. 1, except he may not be treated as above in (b).

Field punishment is to be carried out regimentally when the unit is actually on the move; when the unit is halted it is carried out under a P.M., or an Assistant P.M.

When the unit is on the move an offender sentenced to field punishment No. 1 is exempt from the operation of (b), but all offenders sentenced to field punishment are to march with their units, carry their arms and accoutrements, perform all their military duties as well as extra fatigue duties, and be treated as defaulters.

Field punishment for a period not exceeding three months may be awarded by a court-martial for any offence committed on active service. It may also under the same conditions be awarded by a C.O. to a soldier not being a N.C.O. for a period not exceeding 28 days.

FORMS OF CHARGES FOR COURTS-MARTIAL UNDER THE I.A.A., WHICH MAY OCCUR ON ACTIVE SERVICE ARE SHOWN BELOW.

(Many of these are equally applicable in peace)

Commencement of Charge Sheet.

The Accused (*number*), *rank*, *name*, *corps* is charged with—

or.

The Accused (*name*) being a person subject to Indian Military Law under the provisions of Section 2 (1) (c) of the Indian Army Act is charged with—

or.

The Accused (*name*) being a person subject to Indian Military Law as an officer (*or warrant officer, or non-commissioned officer*) under the provisions of Section 2 (1) (c) and Section 3 (1) of the Indian Army Act is charged with—

Statement of Offence and Particulars.

1. In presence of an enemy shamefully casting away his arms. Sec. 25(b).

In that he at on
when on outlying piquet and attacked by the enemy, shamefully cast away his rifle, left his piquet and ran away. Maximum punishment—Death.

Sec. 25 (b). 2. *In presence of an enemy misbehaving in such manner as to show cowardice. Maximum punishment—Death.*

Sec. 25 (c). 3. *Communicating intelligence to the enemy. Maximum punishment—Death.*

Sec. 25 (f). 4. *In time of war intentionally occasioning a false alarm in camp. Maximum punishment—Death.*

Sec. 25 (g). 5. *When a sentry in time of war sleeping upon his post Maximum punishmen.—Death.*

Sec. 25 (h). 6. *In time of action leaving his commanding officer to go in search of plunder. Maximum punishment—Death.*

Sec. 25 (i). 7. *In time of war quitting his guard without leave. Maximum punishment—Death.*

Note.—For "Guard" any of the words "piquet," "party," or "patrol" may be substituted.

Sec. 25 (j). 8. *In time of war using criminal force to a person bringing provisions to the camp of H.M. Forces. Maximum punishment—Death.*

Sec. 25 (j) 9. *In time of war forcing a safeguard. Maximum punishment—Death.*

Sec. 26 (a). 10. *Forcing a sentry. Maximum punishment—14 years R.I.*

Sec. 26 (c). 11. *When or guard plundering property placed under charge of his guard. Maximum punishment—14 years R.I.*

Sec. 27 (a). 12. *Joining in a mutiny. Maximum punishment—Death.*

Sec. 27 (d). 13. *Using criminal force to his superior officer, knowing him to be such. Maximum punishment—Death.*

Sec. 27 (d). 14. *Attempting to use criminal force to his superior officer, knowing him to be such. Maximum punishment—Death.*

Sec. 27 (d). 15. *Committing an assault on his superior officer, knowing him to be such. Maximum punishment—Death.*

Note.—An assault is a gesture or preparation intended to cause, or known to be likely to cause, an apprehension that the person making it is about to use criminal force.

Sec. 27 (e). 16. *Disobeying the lawful command of his superior officer. Maximum punishment—Death.*

Sec. 28 (a). 17. *Being grossly insubordinate to his superior officer in the execution of his office. Maximum punishment—14 years R.I.*

Sec. 28 (b). 18. *Refusing to assist in the making of a military work in the field. Maximum punishment—14 years R.I.*

Sec. 28 (c). 19. *Impeding a provost marshal. Maximum punishment—14 years R.I.*

Sec. 29. 20. *Deserting the service. Maximum punishment—Death.*

Sec. 29. 21. *Attempting to desert the service. Maximum punishment—Death.*

Sec. 30. 22. *Absenting himself without leave—Maximum punishment—14 years R.I.*

Sec. 31 (a). 23. *Dishonestly misappropriating military stores, the property of Government entrusted to him. Maximum punishment—14 years R.I.*

Sec. 31 (d). 24. *Committing theft in respect of the property of Government. Maximum punishment—14 years R.I.*

25. *Committing theft in respect of the property of a person subject to military law. Maximum punishment—14 years R.I.* Sec. 31 (d).

26. *Intoxication. Maximum punishment—14 years R.I.* Sec. 32.

Note.—If the accused was on duty this circumstance, and the nature of the duty, should be stated in the particulars of the charge.

27. *Negligently suffering to escape an enemy placed under his charge. Maximum punishment—Death.* Sec. 33.

28. *An act prejudicial to good order and military discipline. Maximum punishment—14 years R.I.* Sec. 39 (1).

29. *In a place beyond British India committing a civil offence, that is to say (here specify the offence). Maximum punishment—as in I.A.A. Sec. 41.)* Sec. 41.

30. *Committing murder against a person subject to military law. Punishment—Death or transportation for life.* Sec. 42.

Note.—One or other of these punishments, is obligatory on a conviction for murder. Nothing less can be awarded.

54. PROVOST MARSHAL AND MILITARY POLICE.

1. The provost marshal commands the military police, and with his assistants, is responsible for the organization, efficiency and distribution as required. They receive their instructions from the A.G.'s branch of the staff.

2. The military police are responsible for arresting all persons found without passes, plundering, making unlawful requisitions, or committing offences of any kind; for collecting stragglers and conducting them to the nearest troops, and for guarding against spies.

3. In case of emergency they may call on any troops to assist them by supplying guards, sentries, or patrols, as may be necessary.

4. All persons belonging to, or employed by, the army are required to give them every assistance.

5. Provost and assistant provost marshals wear a badge marked "P.M." or "A.P.M." on the left arm; military policemen a badge marked "M.P." on the left arm.

6. In India, on active service, the provost marshal can punish corporally, then and there, and person below the rank of N.C.O. who in his view, or that of any of his assistants, commits any breach of good order and military discipline. Punishment not to exceed 30 lashes (or such lower amount as O.C. troops may determine) and to be inflicted with the regulation cat.

55. PRISONERS OF WAR.

1. The right of killing an armed man exists only so long as he resists. As soon as he submits he is entitled to be treated as a prisoner of war.

2. Quarter must never be refused unless men have been guilty of violation of the customs of war. Even then they should be tried.

3. Wounded prisoners must be cared for.

4. If questioned prisoners must give name and rank, but cannot be compelled to give any other information.

5. The capture of prisoners of war will be reported to superior authority. The body of troops which takes them will arrange

for their custody and subsistence until instructions are received from the General Staff as to their disposal, when the further arrangements devolve on the A.G.'s branch of the staff.

6. The private property of prisoners is to be respected, but their arms, horses, and military papers must be surrendered. Large sums of money will be disposed of under the orders of superior authority.

7. Prisoners will be personally warned that any one resisting the escort or attempting to escape will be fired on.

8. On the march, during halts, and especially in case of attack, prisoners must be kept as concentrated as possible.

9. They must not be allowed to converse with the escort, or with inhabitants.

10. Prisoners will not be granted parole except under the orders of the C. in C.

56. INTERNATIONAL LAW.

SUMMARY OF THE GENEVA CONVENTIONS, DECLARATION OF ST. PETERSBURG AND THE HAGUE CONVENTION.

SUMMARY OF THE

1.—GENEVA CONVENTION OF 22ND AUGUST, 1864.

(This is still in force in the case of hostilities when both or one of the belligerents were signatories of it but have not acceded to the Convention of 1906.)

(1) Military ambulances and military hospitals must be protected and respected, provided they contain more than one patient, and are not held by a military force (Article I). The material of a military hospital is liable to capture, but that of an ambulance is not (Article IV).

(2) The personnel of military ambulances and military hospitals, including chaplains, are not liable to capture while actually employed in them and so long as there is more than one wounded patient to bring in and succour (Article II).

(3) The personnel are at liberty to continue these duties or to withdraw if their ambulance or hospital is captured. When they cease their duties they must be delivered to their outposts (Article III). They are only entitled to carry away articles which are their own private property (Article IV).

(4) Inhabitants who assist wounded must be left free; if they shelter and take care of wounded in their houses they must be exempted from billeting and part of war contributions. They must be informed of these privileges by the generals of the belligerents.

(5) Sick and wounded soldiers must be cared for regardless of their nationality. Wounded may be restored after an action by mutual consent. Wounded prisoners incapable of further service must be sent back when fit to be moved; others may be sent back if they pledge themselves not to bear arms again in the war then being waged (Article VI).

(6) Convoys of evacuation with the personnel in charge of them must not be captured.

(7) The distinctive flag for hospitals, ambulance and convoys of evacuation is the Red Cross on a white ground. The national flag (of the belligerent) must be flown with it. The personnel may wear an arm badge with the same device. This badge can only be issued by the military authorities. (It should have a number and an official stamp.)

(8) Commanders-in-Chief must arrange for the execution of details of the Convention in accordance with the instructions of their Governments and in conformity with the general principles of the Convention.

Note.

Voluntary aid societies of belligerents and neutrals are not referred to in the Convention and therefore have no rights under it. The medical assistance they supply must, therefore, be incorporated into the army medical services; the military ambulances and military hospitals with which the Convention alone deals.

The Convention is somewhat narrow in its terms, but it should always be interpreted liberally.

The Convention has been acceded to by all the civilized powers except one or two of the South American Republics.

The French text of the Conventions is the authoritative one, and should be referred to in all cases of dispute.

SUMMARY OF THE

2.—GENEVA CONVENTION OF 6TH JULY, 1906

(This Convention has now been ratified by all the more important nations, except France and Japan).

I.—The Wounded and Sick.

(1). *Officers, soldiers, and other persons officially attached to armies must be taken care of when wounded or sick without distinction of nationality; but if a belligerent is compelled to abandon them he must, as far as military exigencies permit, leave some medical staff, with material, to take care of them.

(2). Wounded and sick, if captured, are prisoners of war; but belligerents are free to exchange or restore them, or to hand them over to a neutral State, with its consent, for internment.

(3). After an action, the occupant of the field must have search made for the wounded, and protect wounded and d ad from pillage and maltreatment. The dead must be carefully examined before burial or cremation.

(4). Each belligerent must send to the enemy the military identification marks or tokens found on the dead, and lists of wounded or sick prisoners; also information as to any subsequent casualties among the prisoners. Articles of personal use, valuables, letters, &c., found on the battlefield, or belonging to wounded or sick who die in hospital, must be collected and forwarded to the authorities of their country for transmission to their relatives.

(5). Inhabitants may be appealed to to assist, under direction, in collecting and caring for the wounded and sick. Those who respond may be granted special protection and certain immunities. (This article is not obligatory, and does not prevent the requisition of any labour that is necessary.)

II.—Medical Units and Establishments.

(6). Mobile military units and the fixed establishments of the medical service must be respected and protected.

(7). They lose this privilege if made use of to commit acts harmful to the enemy.

(8). The following are not reckoned harmful:—(a) That personnel is armed and uses arms for defence of themselves or of sick and wounded; (b) That in default of armed orderlies, the unit or establishment is guarded by a piquet or sentries furnished with an authority in due form; (c) That the weapons and ammunition of the wounded are found in the medical formation.

III.—Personnel.

(9). Personnel engaged exclusively in collection, transport, and treatment of wounded and sick, in the administration of medical formations, the guard mentioned in 8 (b), and all military chap-

* The paragraphs are numbered to correspond with the Articles of the Convention.

lains must be respected and protected; they must not be treated as prisoners of war.

(10). Personnel of Voluntary Aid Societies duly recognized and authorized by their Government, who are employed in military medical formations and are subject to military law, have the privileges mentioned in (9).

(11). A recognized Society of a neutral country, before it can assist a belligerent with its personnel and units, must first obtain the consent of its own Government and the authorisation of the belligerent, who, before making use of it, must notify his adversary.

(12). Persons designated in (9), (10), and (11), if they fall into enemy's hands, must continue their duties under his direction; when no longer indispensable, they must be sent back to their army or their country; but at such times and by such route as their captors may think fit. They must be allowed to take with them their private instruments, arms, horses and effects.

(13). Persons mentioned in (9), while in hands of enemy, must be given the same pay and allowances as persons of similar rank in his Army.

IV.—Material.

(14). Mobile medical units (*i.e.*, those which are intended to accompany an army into the field, *e.g.*, field ambulances, hospital trains, hospital barges, &c.), retain their material, including teams, irrespectively of the means of transport and drivers employed, and must be returned as laid down in (12) for the personnel, and so far as possible at the same time. If necessary, however, the material may be used for treatment of wounded and sick.

(15). In contradistinction, the buildings and material of fixed establishments can be captured, but must be used for the wounded and sick as long as necessary; in cases, however, of urgent military necessity, the patients may be removed, provided arrangements are made for them elsewhere.

(16). The property of the Societies mentioned in (10) and (11) is considered private property, liable to requisition, but not to confiscation (*see*, however, 14 for mobile units).

V.—Convoys of Evacuation.

(17). Convoys must be treated as mobile units in (14), except (a) an intercepted convoy may be broken up in case of necessity, provided the wounded and sick are taken charge of; (b) if this is done, the military personnel detailed for transport or guard, and furnished with authority in due form, must be sent back as in (12). Boats and railway trains specially fitted up for evacuations, as well as army medical material used for fitting up ordinary vehicles, trains, and boats, must be restored as in (14). Military vehicles not belonging to the medical service may be captured with their teams. Any civilian personnel and transport requisitioned are subject to further requisition, but cannot be confiscated.

VI.—Distinctive Emblem.

(18). The Red Cross on a white ground is the sign and distinctive emblem of the army medical service.

(19). It will be shown on the flags, armlets, and all material of the medical service, with permission of the military authorities.

(20). The personnel protected under (9), except the guard, (10) and (11), must wear the armlet, stamped by the military authorities fixed to the left arm. Persons attached to the army medical service who have no military uniform must be provided with an identity certificate.

(21). The Red Cross flag must not be hoisted except over military medical formations, and then only with consent of the

military authorities. It must be accompanied by the national flag of the belligerent, except when the formation is in the hands of the enemy.

(22). The units of neutral countries mentioned in (11) are included under (21).

(23). The Red Cross must not at any time be used except to protect the formations, personnel, and material mentioned in the Convention.

(24). The Convention is only of force between signatories.

(25). Commanders-in-Chief must arrange the details for carrying out the Convention, as well as cases not provided for, in the general spirit of the Convention.

(26). Troops must be instructed in, and civil population informed of, the provisions of the Convention.

3. Declaration of St. Petersburg, 1868.

The Contracting Parties bound themselves not to employ in war any projectile of a weight below 400 grammes (14 oz.) which is either explosive or charged with fulminating or inflammable substances.

Signatory Powers:—Austria-Hungary, Belgium, Brazil, Denmark, France, Germany, Great Britain, Greece, Italy, Netherlands, Norway, Persia, Portugal, Russia, Sweden, Switzerland, Turkey.

Summary of the

4. Regulations Respecting the Laws and Customs of War on Land.

Final Act of the Second Peace Conference held at the Hague in 1907.

(Under the reservations shown in the footnotes, this convention was signed by the Powers enumerated on page 229).

These Regulations are intended as General Rules of Conduct, so far as military necessities permit; they have not the force of an International Convention.

The paragraphs are numbered to correspond with the Articles of the Regulations.

Section I.—Belligerents.

I. *The Status of Belligerent.*

(1). Laws, rights, and duties of war apply not only to the army, but also to militia and volunteer corps, provided they:—

(a) Are commanded by a person responsible for his subordinates;

(b) Have a fixed distinctive sign recognizable at a distance;

(c) Carry arms openly;

(d) Conduct operations in accordance with the laws and customs of war.

(2). Inhabitants of a territory not under occupation, who, on the enemy's approach, spontaneously take up arms without having time to organize in accordance with (1), will be regarded as belligerents if they carry arms openly and respect the laws and customs of war.

*(3). Both combatants and non-combatants of an army have the right to be treated as prisoners of war.

II. *Prisoners of War.*

(4). Prisoners of war belong to the Government, not to individuals; they must be humanely treated; they retain their personal belongings except arms, horses, and military papers.

*Reserved by Turkey.

(5). They may be interned in any locality within fixed limits, but can only be confined as an indispensable measure of safety.

(6). The State may employ the labour of prisoners of war, other than officers, according to their rank and capacity and prisoners may be authorized to work for the public service, private persons, or on their own account, but the tasks must have nothing to do with military operations. They must be paid for their work; if it is done for the State at the rates paid to soldiers; otherwise at rates settled in agreement with the military authorities. Pay must be used to improve their position; the balance, after deducting cost of maintenance, will be paid on release.

(7). They must be given the same food, quarters, and clothing as the captor's troops.

(8.) They are subject to the military laws, &c., of the captor. Attempts to escape can be punished; but if, after a successful escape, they are again taken prisoners, they are not liable to punishments.

(9). They must declare, if questioned, their true names and rank on pain of loss of privileges of their class.

(10). They may be released on parole if the laws of their country authorize it; they are bound on honour to observe their parole, and their Government must not require nor accept service incompatible with it.

(11). They cannot be made to accept parole, nor can they demand it.

(12). Those liberated on parole, who are re-captured in arms, forfeit their rights to be treated as prisoners of war and can be tried for the offence.

(13). Civilian followers, including contractors and correspondents, in possession of a certificate from their military authorities, have the right to be treated as prisoners of war, if captured and detained.

(14). A Bureau is to be formed in each belligerent State to collect and furnish information with regard to prisoners of war. It will also receive, collect, and transmit to those concerned, all objects of personal use, valuables, letters, &c., found on battlefields or left by prisoners who die.

(15). Relief societies for prisoners, if legally constituted for charitable purposes, will, within bounds of military requirements, be given facilities. Their delegates, if furnished with a personal permit and on giving a written engagement to comply with all regulations, may be admitted to internment and halting places of repatriated prisoners.

(16). The Information Bureau has the privilege of free postage. Gifts, letters, &c., for prisoners, are to be admitted free of postage, duty, and carriage on Government railways.

(17). Officers taken prisoners will receive the same rate of pay as officers of corresponding rank in the country where they are detained; the amount is refunded by their own Government.

(18). Prisoners are to be allowed religious freedom and to attend church, provided they comply with regulations for order and police issued by the military authorities.

(19). Wills of prisoners, death certificates, and burials will be dealt with as in case of soldiers of the captor, due regard being paid to grade and rank.

(20). Prisoners are to be repatriated as soon as possible after peace.

III. *Sick and Wounded.*

(21). Obligations are governed by the Geneva Convention.

Section II. Hostilities.

I. *Means of Injuring the Enemy.*

(22). The right to adopt means of injuring the enemy is not unlimited.

(23). It is forbidden (a) to employ poison or poisoned arms; (b) to kill or wound treacherously; (c) to kill or wound an enemy who has surrendered; (d) to declare no quarter will be given; (e) to employ arms, &c., of a nature to cause unnecessary suffering; (f) to make improper use of a flag of truce, national flag, the enemy's military insignia and uniform, and the Red Cross badge and flag; (g) to destroy or seize enemy's property, unless imperatively demanded by the necessities of war; (h) to declare abolished, suspended, or inadmissible the right of subjects of enemy to institute legal proceedings; also to compel subjects of the enemy to take part against their own country.

(24). Ruses of war and necessary methods for obtaining information are allowed.

(25). Attack or bombardment of undefended localities is forbidden.

(26). Notice of bombardment, except in case of assault, must, if possible, be given.

(27). In sieges and bombardments, buildings devoted to religion, art, science and charity, historic monuments, permanent and temporary hospitals, provided they are not at the same time used for military purposes, must be spared as far as possible. Such places should be marked by a visible sign and notified to the enemy beforehand.*

(28). Pillage of a captured town or place is prohibited.

II. *Spies.*

(29). An individual can only be considered a spy if, acting clandestinely, or on false pretences, he obtains or seeks to obtain information in the zone of operations of a belligerent, with the intention of communicating it to the hostile party. Soldiers not in disguise, soldiers or civilians carrying despatches openly, and balloonists with despatches or maintaining communication between parts of an army or territory, are not spies.

(30). A spy taken in the act cannot be punished without trial.

(31). A spy who has rejoined his army, but is subsequently captured, incurs no responsibility for previous acts of espionage.

III. *Flags of Truce.*

(32). A bearer of a flag of truce must be properly authorized, and must carry a white flag. He and the trumpeter, flag-bearer and interpreter are inviolable.

(33). A commander is not obliged to receive a flag of truce. He may take all steps necessary to prevent the envoy getting information and detain him temporarily in case of abuse of his privileges.

(34). The envoy loses his inviolability if it is proved, beyond a doubt, that he has provoked or committed treachery.

IV. *Capitulations.*

(35). Capitulations must be in accordance with rules of military honour and must be scrupulously observed.

V. *Armistices.*

(36). Armistices are mutual agreements for the suspension of hostilities. If duration is not fixed operations can be resumed at any time, provided the warning mentioned in the terms is given.

(37). They may be local or general. The former suspends hostilities only in a fixed zone; the latter the entire military operations of the belligerent states.

(38). They must be notified officially, and in good time, to authorities and troops. Hostilities are suspended after notification or at a fixed time.

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* At present no special sign is laid down for universal use.

(39). It should be precisely laid down in them what communication may be held between the belligerents and the civil population and between the peoples of the belligerent States.

(40). Serious violation of an armistice gives the other party the right to denounce it and even, in case of urgency, to recommence hostilities immediately.

(41). Violations by individuals only confer right to demand punishment and indemn'ty.

SECTION III.—MILITARY AUTHORITY OVER HOSTILE TERRITORY.

(42). Territory is occupied when actually under the authority of the hostile army; such authority must be established and operative.

(43). The occupant must as far as possible insure public order and safety, and respect, unless absolutely prevented, the laws of the country.

*(44). Compulsion of population of occupied territory to furnish information about the other belligerent's army or means of defence is prohibited.

(45). Pressure on population to take oath of allegiance is prohibited.

(46). Family honours, rights, religion, lives and liberty and private property, must be respected. The last must not be confiscated.

(47). Pillage is expressly prohibited.

(48). Taxes, &c., if collected, should be, as far as possible, in accordance with rules and assessment in force; the occupant must then defray expenses of administration.

(49). If other money taxes are levied, they can only be used for military necessities or the administraton of the territory in question.

(50). No general penalty can be inflicted on the population for acts of individuals for which it is not collectively responsible.

(51). No tax can be collected except on the written order of a general in command. Receipts must be given.

(52). Requisitions can only be demanded for military needs, they must be proportionate to resources of the country and not involve the inhabitants taking part in military operations against their own country. Contributions in kind must be paid for or receipts given.

(53). The occupant can only take possession of State property, including cash, which may be used for military operations. Property of companies and private persons, such as railways, telegraphs, ships, arms and war material may be used, but must be restored at peace and indemnities paid.

(54). Submarine cables connecting an occupied territory with a neutral territory are not to be seized or destroyed except when absolutely necessary, and must be restored and indemnities paid at the conclusion of peace.

(55). The captor is only the administrator, and has only the right to use public buildings, real property, forests and agricultural works belonging to the hostile State. He must not sell or dispose of them.

(56). The property of local authorities, of religious, charitable and educational institutions, of institutions of Art and Science, even when State property, must be treated as private property. Seizure, destruction or intentional damage to them or to historical monuments is prohibited.

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*Reserved by Germany, Austria-Hungary, Japan, Montenegro and Russia.

THE RIGHTS AND DUTIES OF NEUTRAL POWERS AND PERSONS IN WAR.

(Under the reservations shown in the footnotes this Convention was signed by the Powers enumerated on page 229, with the addition of Spain.)

I.

RIGHTS AND DUTIES OF NEUTRAL POWERS.

(1). The territory of neutral Powers is inviolable.

(2). Belligerents are forbidden to move troops or convoys across neutral territory.

(3). Belligerents are forbidden to erect on neutral territory means of communication with forces on land or sea; or to use any installation established by them for purely military purposes on neutral territory before the war and not previously opened for public messages.

(4). Corps of combatants must not be formed, nor recruiting agencies opened, on neutral territory.

(5). A neutral Power must not allow (2) (3) (4) to occur on its territory.

(6). Responsibility of a neutral Power is not involved by persons crossing the frontier individually to offer their services to one of the belligerents.

(7). A neutral Power is not bound to prevent the export or transit of arms, munitions of war, or anything of use to an army or fleet.

(8). A neutral Power is not bound to forbid or restrict the use on behalf of belligerents of telegraph or telephone cables or wireless telegraphy apparatus belonging to it or to companies or to private individuals.

(9). A neutral Power must apply restrictions in (7) and (8) impartially to the belligerents; and is responsible that companies or private owners observe this obligation.

(10). The resistance of attempts to violate its neutrality offered by a neutral Power cannot be regarded as a hostile act.

II.

INTERNMENT OF BELLIGERENTS AND CARE OF THE WOUNDED IN NEUTRAL TERRITORY.

(11). Belligerent troops which enter a neutral State must be interned, as far as possible, at a distance from the theatre of war, in camps, fortresses, or other localities. The neutral State decides whether officers may be admitted to remain in its territory on parole.

(12). The neutral Power shall, failing a special Agreement, supply the interned with food, clothing and relief: the expense being refunded at the end of the war.

(13). The neutral Power receiving escaped prisoners of war shall leave them at liberty; if it allows them to remain in its territory it may assign them a place of residence. This also applies to prisoners of war brought by troops taking refuge in neutral territory.

(14). The neutral Power may permit wounded or sick to pass through its territory, provided the trains bringing them carry neither combatants nor war material; it must take due measures of precaution. Any sick and wounded prisoners brought into the neutral State, also any sick and wounded who are left instead of being passed through, must be detained, so as to insure their not again becoming belligerents.

(15). The Geneva Convention applies to sick and wounded interned in neutral territory.

III.

Neutral Persons.

*(16). Subjects or citizens of a State which is not taking part in the war are deemed neutrals.

*(17). A neutral cannot claim the benefit of his neutrality if he commits hostile acts against a belligerent, or if he commits acts in favour of a belligerent; in such a case he must not be more severely treated than a subject or citizen of the other belligerent State.

*(18). The furnishing of supplies, or making loans, provided that the persons so doing neither lives in the territory of the other party nor in the territory occupied by it, and that the supplies do not come from such territory, or services rendered in matters of police or civil administration, must not be considered as acts committed in favour of one belligerent within the meaning of (17).

IV.

Railway Material.

† (19). Except when absolutely necessary, a belligerent must not requisition or use railway material coming from the territory of neutral Powers, whether the property of the said Powers, companies, or private persons, and when used it must be returned as soon as possible to the country of origin.

Likewise, a neutral Power may retain and utilize to a corresponding extent railway material coming from the territory of the belligerent Power.

On either side compensation will be paid.

Bombardment by Naval Forces.

(Under the reservations shown in the footnotes, this Convention was signed by the Powers enumerated on p. 229.)

I.

Bombardment of Undefended Ports, Towns, Villages, Dwellings or Buildings.

‡ (1). The bombardment by naval forces of undefended ports, towns, villages, dwellings, or buildings is forbidden; a place may not be bombarded solely on the ground that automatic submarine contact mines are anchored off the harbour.

(2). Military works, military or naval establishments, depôts of arms or war material, workshops or plant which could be utilized by the hostile fleet or army and ships of war in the harbour are not included in this prohibition. The commander of a naval force may destroy them with artillery after a summons followed by a reasonable interval, if all other means are impossible, and when the local authorities have not themselves destroyed them within the time fixed, and no responsibility is then incurred by the commander for any unavoidable damage. If for military reasons immediate action is necessary, the prohibition to bombard the undefended town holds good, and the commander will take all due measures in order that the town may suffer as little harm as possible.

* Reserved by Great Britain.

† Reserved by Argentina.

‡ The latter clause of this article was reserved by France, Great Britain, Germany and Japan.

*(3). After due notice the bombardment of undefended ports, towns, etc., may be commenced, if the local authorities, on a formal summons being made to them, decline to comply with requisitions for provisions or supplies necessary for the naval force in question. Such requisitions will be proportional to the resources of the place, and will be demanded in the name of the commander of the said naval force. When not paid for in ready money, receipts will be given.

(4). The bombardment of undefended ports, etc., on account of failure to pay money contributions, is forbidden.

II.

GENERAL PROVISIONS.

(5). In bombardments by naval forces the commander will take all necessary steps to spare buildings dedicated to public worship, art, science, or charitable purposes, historic monuments, hospitals, and places where the sick or wounded are collected, provided that they are not used at the time for military purposes. Such buildings will be indicated by large stiff rectangular panels divided diagonally into two painted triangular portions, the upper portion black, the lower portion white.

(6). Unless military exigencies render it impossible, the commander of a naval attacking force will warn the authorities before commencing the bombardment.

SIGNATORY POWERS.

Argentina.
Austria-Hungary.
Belgium.
Bolivia.
Brazil.
Bulgaria.
Chile.
Columbia.
Cuba.
Denmark.
Dominican Republic.
Ecuador.
France.
Germany.
Great Britain
Greece.
Guatemala.
Hayti.
Italy.
Japan.
Luxemburg.
Mexico.
Montenegro.
Netherlands.
Norway.
Panama.
Paraguay.
Peru.
Persia.
Portugal.
Rumania.
Russia.
Salvador.
Servia.
Siam.
Sweden.
Switzerland.
Turkey.
United States.
Uruguay.
Venezuela.

Three declarations:—

1. Prohibits until the conclusion of the next Peace Conference the discharge of projectiles and explosives from balloons or by other new methods of a similar nature. Declarations annexed
2. Renounces the use of projectiles sole object of which is the diffusion of asphyxiating or harmful gases.
3. Renounces the use of bullets which expand or flatten easily in the human body.

1 has been signed by China and the above Powers, with the exception of Chile, Denmark, France, Germany, Guatemala, Italy, Japan, Mexico, Montenegro, Paraguay, Rumania, Russia, Servia, Sweden and Venezuela.

2 and 3 have been signed by practically all the Powers.

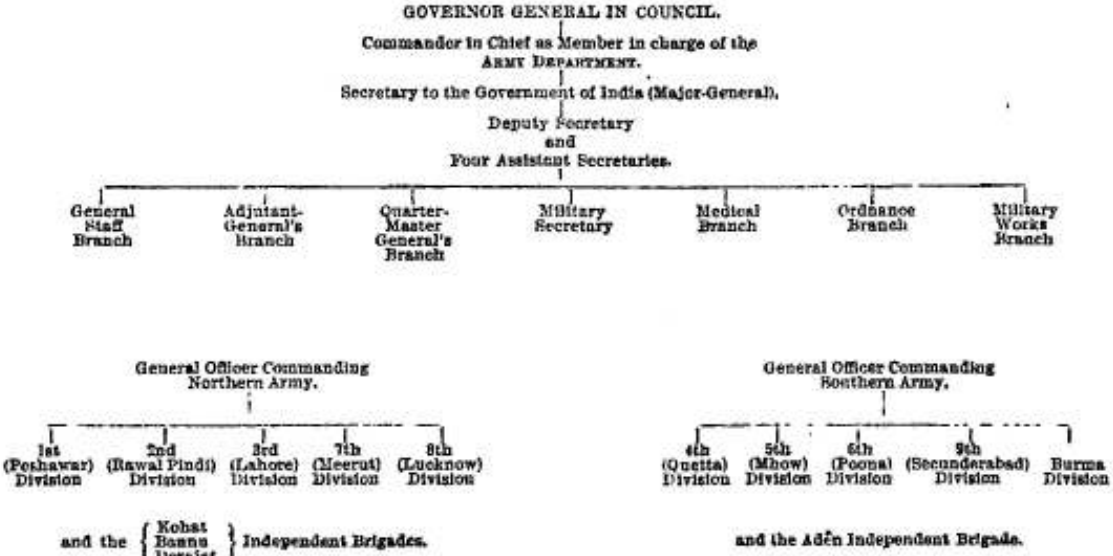
* Reserved by Chile.

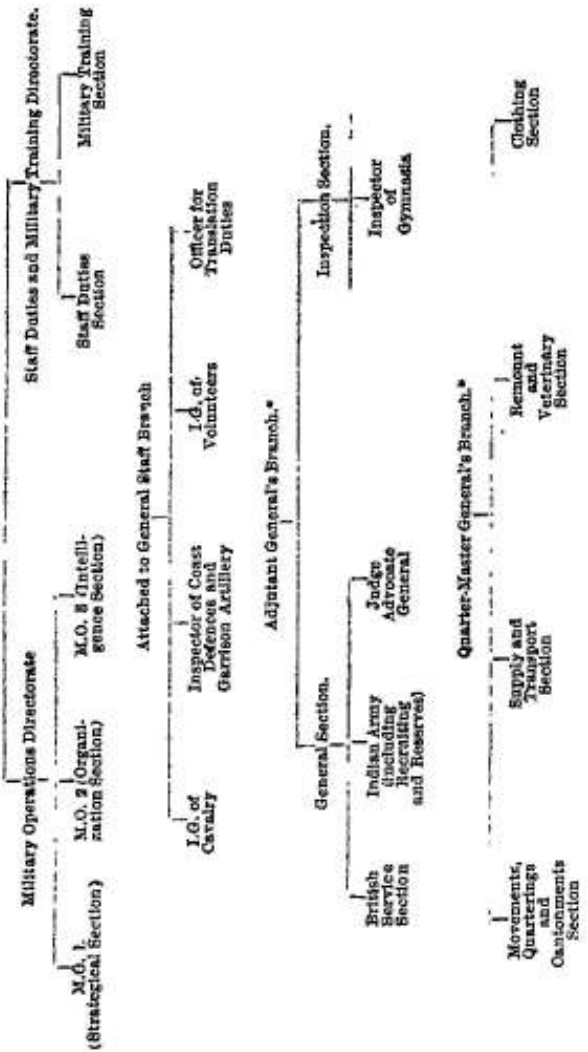
CHAPTER IX.

57. THE ARMY IN INDIA.

1. The Governor General in Council is the supreme head of the Army in India, and under him the business of the Army is managed by the Army Department of the Government of India and by the Military Finance Branch of the Finance Department of the Government of India.

2. The Commander-in-Chief in India is the Member of Council in charge of the Army Department. The organization of Army Administration is shown in the following diagrams:—


GOVERNOR GENERAL IN COUNCIL.
Commander in Chief as Member in charge of the ARMY DEPARTMENT.
Secretary to the Government of India (Major-General).
Deputy Secretary and Four Assistant Secretaries.
General Staff Branch
Adjutant-General's Branch
Quarter-Master General's Branch
Military Secretary
Medical Branch
Ordnance Branch
Military Works Branch
General Officer Commanding Northern Army.
1st (Peshawar) Division
2nd (Rawal Pindi) Division
3rd (Lahore) Division
7th (Meerut) Division
8th (Lucknow) Division
and the Kohat Bannu Derajat Independent Brigades.
General Officer Commanding Southern Army.
4th (Quetta) Division
5th (Mhow) Division
6th (Poona) Division
9th (Secunderabad) Division
Burma Division
and the Adén Independent Brigade.



*The reorganization of the A.G's. and Q.M.G's. Branches on the Directorate system is under consideration (1911).

3. A Division in the Field consists of:—

Divisional Hd. Qrs.

3 Infantry Brigades (1 British and 2 Indian in the case of homogeneous Brigades).

Divisional Troops (namely, 1 Regiment Indian Cavalry, 1 Battalion Pioneers, 3 18-pr. Q.F. Field Batteries with Brigade Hd. Qrs., 2 Mountain Batteries, 2 Companies Sappers and Miners, 1 Divisional Signal Coy., 1 Printing Section, 1 Photo-Litho Section, 2 British Field Ambulances, 3 Indian Field Ambulances, 1 Field Post Office (1st Class), Divisional Ammunition Column, Divisional Troops Supply Column.

Survey Party.

Divisional Supply Column.

4. A Cavalry Brigade consists of—

Briagde Hd. Qrs., 1 Horse Artillery Battery, 1 British Cavalry Regiment, 2 Native Cavalry Regiments, Cavalry Brigade Ammunition Column 1 Section British Cavalry Field Ambulance, 2 Sections Indian Cavalry Field Ambulance, 1 Field Post Office (1st Class), Brigade Supply Column.

5. Infantry Brigades are either homogeneous or mixed.

A homogeneous Infantry Brigade consists of—

Brigade Hd. Qrs., 4 Battalions (British or Indian, as the case may be), 1 Field Post Office (1st Class), Brigade Supply Column.

A mixed Infantry Brigade (the normal organization) consists of—

Brigade Hd. Qrs., 1 British Battalion, 3 Indian Battalions, Field Post Office (1st Class), Brigade Supply Column

6. The Army in India consists of—

	British.	*Natives.*
Cavalry Regiments	9	39‡
Infantry Battalions	52	138†
R.H.A. Batteries	11	—
R.F.A. Batteries	45	—
Mountain Batteries	8	12
Heavy Batteries	6 *	—
Companies, R.G.A.	21	1*
" R.E	1	—
Service Companies Sappers and Miners	—	19‡

War Establishments in India are given in Chapter I.

7. Men are enlisted in the Indian Army for "General Service." The period of engagement is for 3 years, which may be extended to 32 years.

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† Of those, 5 are employed in China and the Colonies.

* Frontier Garrison Artillery.

‡ There are, in addition, 2 Railway Companies, 1 Fortress Company, 4 Divisional Signal Companies, and 3 Depôt Companies

8. Transport in India consists of "Organized" and "Unorganized." The former is maintained by Government in peace time and is formed into—

Cavalry Brigade Mule Corps.
" " " Cadres.
Pack Mule Corps.
" " Cadres.
Pony Cart Trains.
Camel Corps.
Half Troops, Army Transport Bullocks.
" " Siege Train Bullocks.

The "Unorganized" transport consists of registered mules, ponies, camels and bullocks, which would, on mobilization, be utilized for expanding the cadres of organized transport, forming additional corps and making good wastage.

There are the following Auxiliary Forces:—

	British.	Native.
Volunteers	32,000*	—
Military Police	—	21,000‡
Border Military Police, Militia and Levies	—	13,300‡
Imperial Service Troops (furnished by the Native States)	—	20,500

9. The Indian Army Reserve is in process of expansion, and will eventually consist of 50,000 men.

10. The Native Army is divided into:—53 "Class" regiments and battalions, which are composed of entirely one class of men, *e.g.*, Gurkhas, Sikhs or Dogras, etc.; and 125 "Class Company or Squadron" regiments and battalions. These consist of men of several classes or races, but squadrons and companies are generally of one class. Thus a "Class Company" battalion may contain 2 companies of Pathans, 2 of Punjabi Muhammadans, and 4 of Sikhs.

Army Bearer Corps	11	Companies
British Field Ambulances	44	"
Indian " "	90	"

Also Field and Base Medical Store Depôts and 9 British and 10 Indian General Hospitals, each of 500 beds.

Veterinary Field Hospitals	12
Base Veterinary Store Depôts	3

The men of the Indian Army may be divided into two main categories—Muhammadans and Hindus.

The chief Muhammadan classes that are enlisted are the North-West Frontier Pathans (sub-divided into classes, such as Afridis, Orakzais, Khattaks, Usufzais, Mohmands, Waziris, etc.); Baluchis, Hazaras and Punjabi Muhammadans. Under the general term Hindu are included Sikhs, Gurkhas, Dogras, Jats, Mahrattas, Brahmans, Garhwalis, and Punjabi and Hindustani Hindus.

The above are distributed in the Army as follows:—

Muhammadans ...	76	Squadrons.	350	Companies.
Hindus	79	"	727	"
Mixed			43	"

* Effectives.

‡ Including British Officers.

Percentage throughout the whole Army is:—

Muhammadans	35·3
Hindus	63·3
Christians	1·23
Jews	0·02
Others	0·15

Languages:—

Punjabi is spoken by ...	Punjabis, Sikhs, Dogras.
Pushtu " " ...	Frontier tribes (Afridis, Waziris, etc.).
Hindi " " ...	Rajputs, Jats.
Mahrathi " " ...	Mahrattas.
Parvatiya " " ...	Gurkhas.

But *Urdu* (the language of the camp) is the official language of the Army, and is understood by all.

58. THE MILITARY FORCES OF THE OVERSEA DOMINIONS, CROWN COLONIES AND PROTECTORATES OTHER THAN INDIA.

1. A summary of the forces maintained in the British Dominions over the Seas other than in India is given in the following table; the nature of these forces, and an outline of their organization are also indicated.

2. At the Imperial Conference of 1909 it was unanimously agreed that the organisation of all the forces of the Empire should be assimilated as far as possible. It is reasonable to hope, therefore, that any units which may be despatched by Overseas Dominions to co-operate in an Imperial undertaking, will not differ greatly in establishment and organization from similar units of the Regular Army.

58.—LAND FORCES OF BRITISH DOMINIONS, COLONIES AND PROTECTORATES OTHER THAN IN INDIA.

	Name of dominion, colony, or protectorate.	Nature of Force.	Term of engagement.	Arms and Armaments exclusive of that of Fixed Defences.	Organization.
Part I.—Dominion of Canada.	Canada...	Permanent Militia ...	years. 3	18-pr. Q.F., 12-pr. B.L., 60-prs. and howitzers, M.L.E. and Ross rifles, and Maxims.	Units of all arms and departments. The permanent force and active militia together, comprise— 27 regiments and 5 independent squadrons cavalry and mounted rifles. 2 batteries horse artillery. 36 " field artillery. 13 companies } garrison artillery. 14 heavy batteries } 1 field troop. 5 field companies } engineers. 3 fortress companies } 1 section field telegraph company attached to each field company. Corps of Guides. 99 regiments and 6 independent companies of infantry. Signalling corps. Departmental troops.
		Active Militia	3	As above	Organized as 5 cavalry brigades, 10 brigades field artillery, and 20 infantry brigades. A Militia Council presided over by the Minister of Militia and Defence, administers the forces. Eastern Canada is sub-divided into six divisional areas, in each of which a division of all arms is organized. Western Canada is divided into three military districts.

	Royal N.W. Mounted Police	5	Winchester carbines, Lee-Metford rifles, and Colt revolvers.	Organized into 12 divisions and administered by a Controller at Ottawa.
	All males between the ages	of 18	and 60 are liable for service	in time of emergency.
Australia ...	Administrative and Instructional Staff (permanent)	...	... ...	A separate organization to which admission by examination is open to all ranks and all branches of the Commonwealth forces; organized for command, administrative and instructional purposes.
	Permanent Force	5	18-pr. Q.F.	2 field batteries, 6 district establishments and 10 companies of garrison artillery, S.M.M. and electric light sections engineers, and nucleus of departmental services.
	Militia	3	18-pr. Q.F., howitzers, and M.L.E. rifles. Maxims and other machine guns.	The forces are organised as— (i) *Field Force.*—(Entirely militia)— 5 brigades of light horse. 2 „ „ infantry. 4 mixed brigades. (ii) *Garrison Troops*—Composed of permanent and militia garrison artillery and engineers, militia light horse, and infantry. The above forces are distributed among the 6 district commands whose areas coincide with those of the 6 States of the Commonwealth. *The Militia* comprises— 19 regiments light horse. 14 field and 2 heavy batteries of artillery. 17 companies garrison artillery.

LAND FORCES OF BRITISH DOMINIONS, COLONIES AND PROTECTORATES OTHER THAN INDIA, 1909-10.—*continued.*

Name of dominion, colony, or protectorate.	Nature of Force.	Term of engagement.	Arms and Armament exclusive of that of Fixed Defences.	Organization.
		years.		
Australia—*cont.*	Militia—*cont.*			*The Militia* comprises—*cont.*— 6 field troops 2 field companies 3 ½ field companies 1 telegraph company 2 fortress companies 6 electric light companies 2 S.M.M. companies } Engineers. 25 battalions of infantry. An Intelligence Corps. 9 companies Corps of Signallers. Departmental Corps. An Army Nursing Service and an Automobile Corps are in process of conversion from *Volunteers* to *Militia*.
	Reserve and Rifle Clubs ...	...	L.E. and M.E. rifles ...	*The Reserve* consists of—Members of rifle clubs who have taken the required oath, and of persons who, having served in the active forces, are enrolled as members of the reserve. The forces are under a Minister of Defence, advised by a Council of Defence, but they are administered by a Military Board of which the Minister is president.

	All male inhabitants between the ages of 18 and 25 years, ages of 18 and 60 are liable to be called out for service in time of war. Men between the ages of 18 and 25 are, under a recently passed Act, obliged to train in the Citizen Forces.			
Papua	Police (natives)	2	M.E. rifles	Civil organization.
New Zealand	Permanent Force	8	15-pr. B.L. and Maxim guns.	*Permanent*— Permanent staff. Garrison artillery, with a small section of field artillery and an electric light section.
	Territorial Force	3	M.L.E. and M.E. rifles and carbines.	*Territorial Force*— 14 regiments mounted rifles. 5 batteries field artillery. 11 companies garrison artillery. 4 field companies engineers. 1 pioneer company engineers. 16 battalions of infantry. Departmental corps. The forces are commanded and administered by a commandant. The Dominion is divided into 4 military districts, the troops in each district comprising a mixed brigade and garrison troops. The volunteer force was recently converted into a Territorial Force under an amendment to the Defence Act which introduced compulsory service in the Militia.
All males between the ages of 17 and 55 are liable for service and between the ages 18 and 30 years men are obliged to undergo training.				

LAND FORCES OF BRITISH DOMINIONS, COLONIES AND PROTECTORATES OTHER THAN INDIA, 1909-10.—*continued.*

Name of dominion, colony, or protectorate.	Nature of Force.	Term of engagement.	Arms and armament (exclusive of that of Fixed Defences.)	Organization.
		years.		
Union of South Africa—Cape of Good Hope	Permanent Force	5	15-pr. B.L. and 2·6" R.M.L. guns, M.L.E. rifles and ·303 and ·450 Maxims.	Cape Mounted Riflemen (5 squadrons, battery). Organized under a Commandant-General
Natal	Militia	8	15-pr. B.L. guns, and M.L.E. rifles.	Permanent staff. 26 squadrons and 8 troops mounted troops. 3 batteries field artillery. 2 companies engineers. 12 companies infantry. Departmental Corps. Organized under a Commandant.
Cape of Good Hope and Transvaal.	Volunteers	1	12-pr., 13-pr. Q.F., 15-pr. B.L. guns, M.L.E. rifles, and ·303 machine guns.	Staff. 28 squadrons mounted troops. 2 batteries horse artillery. 1 battery field artillery. 6 companies garrison artillery. 8 companies engineers. 50 companies infantry. Cycle and motor corps. Intelligence corps. Departmental corps.

				The Cape Volunteers are organized under a commandant-general, and the Transvaal Volunteers under an inspector.
	Reserves...	...	M.L.E. rifles.	
Newfoundland	Constabulary	...	L.E. rifles	Civil organization.
Bahamas ...	Police (West Indians) ...	6	Snider rifles	Civil organization.
Barbados ...	Volunteers (West Indians)...	3	M.L.E. and M.L.M. rifles, M.E. carbines, Maxims, and 9-pr. guns.	1 company artillery, 2 companies infantry and one company mounted infantry.
	Police (Europeans and West Indians)	1	M.E. rifles and carbines ...	A civil organization comprising mounted and foot detachments and harbour police.
Bermuda ...	Militia and Volunteers ...	6 and 4	... ...	Maintained by Imperial Government.
British Guiana	Militia (Europeans and natives).	3	L.E. rifles and M.E carbines, and 9-pr. guns.	1 artillery company (Europeans), and 1 infantry company (West Indians).
	Volunteers (Europeans) ...	...	L.E. rifles	3 companies of infantry.
	Police (West Indians) ...	3	M.E. rifles and carbines ...	6 divisions and mounted detachment (European staff).
British Honduras.	Volunteers (Europeans and West Indians).	3	M.E. carbines and Maxims	2 sections mounted rifles. 2 companies infantry.
	Police (West Indians) ...	1	Snider carbines	Civil organization.
British North Borneo.	Constabulary (Sikhs, Mohammedans, and Malays).	5	7-pr. R.M.L. guns, M.E. and M.H. rifles, and Maxims.	Organized in 2 divisions (i) military police, (ii) district police.
Ceylon ...	... Volunteers (Europeans and natives).	...	M.L.E. rifles and M.E. carbines, and Maxims.	2 companies garrison artillery. 2 squadrons mounted rifles. 15 companies light infantry. 7 companies Planters Rifle Corps. 1 company medical corps. The force is administered by a commandant of volunteers; training is supervised by the officer commanding the troops in Ceylon.
	Volunteer Reserve (Europeans).	...	...	...

LAND FORCES OF BRITISH DOMINIONS, COLONIES AND PROTECTORATES OTHER THAN INDIA, 1909-10.—*continued.*

Name of dominion, colony, or protectorate.	Nature of Force.	Term of engagement.	Arms and armament exclusive of that of Fixed Defences.	Organization.
		years.		
Cyprus	Police (natives)	5	M.E. carbines	Civil organization.
Falkland Islands.	Volunteers		M.L.E. rifles	1 company infantry.
Fanning Islands	Volunteer Reserve		L.E. Rifles	
Fiji	Constabulary (Fijians) ...	3	M.E. rifles	Semi-military force.
	Rifle Clubs (Europeans)		M.L.E. rifles	Can be called out for service.
Hong-Kong ...	Volunteers (Europeans)		M.L.E. rifles 16 pr. guns, howitzers and Maxims	1 troop scouts. 4 companies artillery. 1 company engineers. 1 company infantry.
	Volunteer Reserve (Europeans). ...		M.L.E. rifles	Civil organization. Members available in time of war.
	Police (Europeans, East Indians, and Chinese).	5	M.L.E. carbines	Civil organization.
Jamaica ...	Militia (West Indians) ...	3	M.E. carbines	1 company artillery.
	Rifle Corps		L.E. rifles	1 rifle club which is being formed into volunteer force.
	Constabulary	5	M.E. carbines	Semi-military organization.
Leeward Islands.	Volunteers (Europeans)		L.E. rifles	Small detachments in each island.
	Police (West Indians) ...	3	L.E. rifles	Civil organization.
Malta	Royal Malta Artillery		British regular troops maintained by Imperial Government.	
	Militia	5	Engineers and 2 battalions infantry maintained by Imperial Government.	

Malay States—Fed. Malay States.	Permanent (Malay States Guides).	5	Maintained for F.M.S. for protection of their own territories—1 company artillery and 7 companies infantry.	
	Volunteers	2	M.L.E. rifles	1 company infantry.
	Rifle Club (Europeans) ...	...	M.L.E. rifles.	
Straits Settlements.	Volunteers (Europeans and Chinese).	2	M.L.E. rifles, 7 pr. guns and Maxims	1 company artillery. 1 company engineers. 4 companies infantry. 1 Maxim gun company. Bearer company.
	Police	3 to 6	M.E. rifles and Snider carbines.	Semi-military organization.
Trinidad ...	Volunteers	3	M.E. rifles, Maxims, and 16-pr. R.M.L. guns.	3 troops light horse. 6 companies of infantry.
	Constabulary (West Indians)	3	M.E. rifles	Organized as a military body and includes mounted, artillery and machine gun detachments.
Windward Islands.	Volunteers (Europeans) ...	3	M.E. and M.L.E. rifles ...	1 section mounted infantry 1 company infantry } in St. Lucia. 1 Maxim gun section Volunteer reserves in St. Lucia and St. Vincent. A volunteer corps is being formed in Grenada.
	Police (West Indians) ...	2	M.E. and M.L.E. rifles ...	
	Rifle Clubs		M.L.E. rifles	Civil organization.
EAST AFRICA.				
East Africa Protectorate.	King's African Rifles ...	3	M.E. and M.L.E. rifles, and ·303 Maxims.	1½ battalions of infantry.* 1st Bn. K.A.R. (2 companies Africans). 3rd Bn. K.A.R., 6 companies infantry, 1 company camelry (Africans).
	Volunteer Reserve	...	M.L.E. rifles and Colt guns.	
	Police	3	M.E. and M.H. rifles ...	Civil organization.

* A garrison of one company, drawn either from the 1st or 3rd Battalion as may be found convenient, is furnished for Zanzibar.

LAND FORCES OF BRITISH DOMINIONS, COLONIES AND PROTECTORATES, OTHER THAN INDIA, 1909-10.—*continued.*

Name of dominion, colony, or protectorate.	Nature of Force.	Term of engagement.	Arms and armament exclusive of that of Fixed Defences.	Organization.
EAST AFRICA.—*cont.*		years.		
Nyasaland ...	King's African Rifles ...	6	M.E. rifles and ·303 Maxims	½ battalion of infantry (2 companies Africans).
	King's African Rifles, Indian contingent.	6	M.E. rifles and ·303 Maxims	1 company Sikhs.
	Volunteer Reserve	...	M.L.E. rifles.	
	Police		M.E. and Snider rifles ...	Civil organization.
Somaliland ...	King's African Rifles, Indian contingent.	...	M.L.E. rifles and ·303 Maxims.	2 companies infantry.
Uganda... ...	King's African Rifles ...	3	M.E. rifles and ·303 Maxims.	1 battalion of infantry (6 companies Africans).
	King's African Rifles, Indian contingent.	3	M.L.E. rifles	1 double company Sikhs.
	Volunteer Reserve	...	M.L.E. rifles.	
	Police	3	M.H. rifles.	
SOUTH AFRICA.				
Basutoland ...	Police (Europeans and natives).	...	M.H. carbines and ·303 Maxims.	Under Resident Commissioner.
Bechuanaland	Police (Europeans and natives).	2	L.E. and M.H. rifles and ·303 Maxims.	Under Resident Commissioner.

N.E. Rhodesia	Police (natives)	3	M.E. carbines, 1·65 Maxim-Nordenfeldt and ·450 Maxims.	Civil organization.
N.W. Rhodesia	Police (natives)	3	M.E. rifles, ·303 and ·450 Maxims.	Civil organization.
Southern Rhodesia.	Volunteers (Europeans) ...	1	M.L.E. rifles	2 divisions of infantry and mounted troops.
	B.S.A. Police (Europeans and natives).	3	L.E. rifles, 7-pr. R.M.L. and 75 m.m. Q.F. guns, ·303 and ·450 Maxims, Colt, Gatling and Nordenfelt machine guns.	Military organization. 8 troops.
	Rifle Clubs		M.L.E. rifles.	
Swaziland ...	Police (Europeans and natives).	...	M.L.E. and M.H. rifles ...	Civil organization.
WEST AFRICA.				
Gambia ...	West African Frontier Force (natives).	6	M.L.E. rifles and ·303 Maxims.	1 company infantry.
	Volunteers (Europeans and natives).	...	M.E. carbines and 6-pr. Q.F. guns.	Artillery detachment.
	Police (natives)	5	M.E. carbines, 7-pr. F.-M.L. guns.	Military organization.
Gold Coast ...	West African Frontier Force	6	M.L.E. rifles, M.E. carbines, 2·95 Q.F. and 7-pr. guns and ·303 Maxims.	Organized as a Regiment— 1 battery artillery. 1 battalion infantry of 8 companies.
	Reserves	...	M.E. carbines.	
	Volunteers (Europeans and natives).	...	L.E. rifles, M.E. carbines, and ·303 Maxims.	8 companies of infantry, 2 gun sections and 2 machine gun sections.
	Northern Territories Constabulary.	6	M.E. carbines, 7-pr. R.M.L. and ·303 Maxim guns.	
	Police (natives)		M.H. carbines	Civil organization

LAND FORCES OF BRITISH DOMINIONS, COLONIES AND PROTECTORATES, OTHER THAN INDIA, 1909-13.—*continued.*

	Name of dominion, colony, or protectorate.	Nature of Force.	Term of engagement.	Arms and armament exclusive of that of Fixed Defences.	Organization.
African Colonies and Protectorates—*cont.*	West Africa—*cont.*		Years.		
	Northern Nigeria.	West African Frontier Force (natives).	6	M.L.E. and M.E. rifles, M.L.M. and M.E. carbines, ·303 Maxims, and 2·95 Q.F. guns.	Organized as a regiment— 1 battery artillery. 3 companies mounted infantry. 2 battalions infantry of 9 companies each.
		Reserves		Do.	
		Police (natives)		M.E. carbines.	Military organization.
	Sierra Leone ...	West African Frontier Force (natives).	6	M.L.E. rifles and ·303 Maxims.	Organized as an infantry battalion of 4 companies.
		Reserves		M.M. and M.E. carbines.	
	Southern Nigeria.	West African Frontier Force (natives).	6	M.L.E. and M.E. rifles, ·303 Maxims, and 2·95 Q.F. guns.	Organized as a regiment— 1 battery artillery. 1 battalion infantry of 12 companies.
		Volunteers		M.E. rifles and ·303 Maxims.	2 companies infantry and two machine gun sections.
		Police (natives)	6	M.E. carbines	Military organization.

59. DETAILS OF FOREIGN ARMIES.

1. Approximate Strength with other Details.

The strength of a Battalion (war strength) can roughly be taken as 1,000, and that of a Squadron at 150.

Country.	Peace Strength	War Strength.	Guns. (a) Peace. (b) War.	Arms. (a) Rifle. (b) Fd. Gun.	Inf. Unit.	Cav. Unit	Art. Unit.	Organization, &c.
Austria-Hungary ...	425,365	2,265,000	(a) 1,218 (b) 3,036	(a) ·315 Mann. (b) 3·00 Q.F.	Rgt., Bns.	Rgt., 6 Sqn.	Batt., 6 Guns	25 Cav. Bdes., 16 Army Corps, Army Corps=3 Divns.=6 Bdes.=42 to 48 Bns.
Belgium ...	42,126	171,000	(a) 204 (b) 312	(a) ·301 Man. (b) 2·95 Q.F.	Rgt., 3 Bns.	Rgt., 6 Sqn.	Batt., 6 Guns	4 Divisions = 13 Bdes (includes 4 reserve brigades) =51 Regts., 5 Cav. Divisions.
Bulgaria ...	56,866	400,000	(a) 964 (b) 954	(a) ·315 Mann. (b) 2·9 Schneider Q.F.	Rgt., 4 Bns.	Rgt., 4 Sqn.	Batt., 4 Guns	9 Divisions, 1 Cav. Division.
China... ...	234,030	503,050	(a) 1,006 (b) 1,114	Various	Rgt., 3 Bns.	Rgt., Sqn.	Batt., 6 Guns	In 36 Divisions, of which 6 are complete and 27 are in process of organization. Four do not yet exist.
Denmark ...	16,300	111,000	(a) (b) } 80	(a) ·315 Krag-Jor (b) 2·95 Q.F.	Rgt., 3 Bns.	Rgt., 4 Sqn.	Batt., 4 Guns	5 Brigades.
France ...	608,000	3,800,000	(a) 2,756 (b) 3,200	(a) ·315 Lebel (b) 2·95 Q.F.	Rgt., 3 or 4 Bns.	Rgt., 5 Sqn.	Batt., 4 Guns	20 Army Corps, 8 Cav. Divisions. Army Corps = 2 Divns. = 4 Bdes =8 Rgts.

APPROXIMATE STRENGTH WITH OTHER DETAILS—*continued.*

Country.	Peace Strength.	War Strength.	Guns. (a) Peace. (b) War.	Arms. (a) Rifle. (b) Fd. Gun.	Inf. Unit.	Cav. Unit.	Art. Unit.	Organization, &c.
Germany ...	622,520*	4,146,000†	(a) 3,036 (b) 6,800	(a) ·311 Man. (b) 3·03 Q.F.	Rgt., 3 Bns.	Rgt., 4 Sqn.	Fd. Batt., 6 Guns; heavy Howr. or Mortar Batt. 4 guns.	23 Army Corps° Army Corps = 2 Divns. = 4 Bdes. = 8 Rgts.
Greece ...	23,294	90,000	(a) 185 (b) 365	(a) ·256 Mann-Schönauer (b) 2·95 Schneider Q.F.	Rgt., 3 Bns.	Rgt., 4 Sqn.	Batt., 4 Guns	3 Divisions.
Italy	243,375	1,214,000	(a) 1,800 (b) 3,320	(a) ·256 Mann Carcano. (b) 2·95 Q.F.	Rgt., 3 Bns.	Rgt., 5 Sqn.	Batt., 6 Guns	13 Army Corps. Army Corps = 2 Divns. = 4 Bdes. = 8 Rgts.
Japan... ...	225,500	1,005,000	(a) 1,094 (b) 1,514	(a) ·256, Year 88 (b) 2·95 Q.F. Yr. 88	Rgt., 3 Bns.	¶Rgt., 2 Sqn.	Batt., 6 Guns	19 Divisions, 4 Cav. Bdes., 3 F.A. Bdes. of 12 Batts. each.
Netherlands	33,000	175,500	(a) 160 (b) 204	(a) ·256 Mann. (b) 2·95 Q.F.	Rgt., 4 Bns.	Rgt., 4 Sqn.	Batt., 6 Guns	4 Divisions.
Norway ...	12,680	149,000	(a) 108 (b) 156	(a) ·256 Krag-Jor. (b) 2·95 Q.F.	Rgt., 3 Bns.	Rgt., 6 Sqn.	Batt., 6 Guns	6 Brigades (mixed).
Portugal ...	31,550	279,000	(a) 144 (b) 336	(a) ·256 Mauser-Vergueira (b) 2·95 Q.F.	Rgt., 3 Bns.	Rgt., 4 Sqn.	Batt., 6 Guns	6 Divisions.
Rumania ...	85,310	500,000	(a) 348 (b) 436	(a) ·256 Mann. (b) 2·95 Q.F. Krupp§	Rgt., 3 Bns.	Rgt., 4 Sqn.	Batt., 4 Guns	4 Army Corps, 1 Cav. Division.

* This is only an average financial establishment. To it must be added 21,000 supernumerary recruits, 12,000 one-year volunteers, and 3,000 employees, making a total of 658,320 all ranks.

† To this should be added 5,800,000 untrained *Ersatz* reservists and *Landsturm*.

° This is the normal organization as laid down in the Field Service Regulations, 1908, but it is understood that each army corps will mobilize a third (Reserve) division.

§ The complete rearmament with this gun will not be completed till 1911.

¶ Rgts. of Cav. Bdes. have 4 Service and 1 Depôt Squadron.

‖ Including 640 Opolchenie guns.

Russia ...	1,200,000	5,529,700	(a) 2,904 (b) 5,606	(a) ·3 8-line (b) 3-in. Q.F.	Rgt., 4 Bns.	Rgt., 6 Sqn.	**Batt., 8 Guns	31 Army Corps‡ and 2 Cavalry Corps. Army Corps = 2 Divns. = 4 Bdes. = 8 Rgts.
Servia ...	35,643	225,000	(a) 246 (b) 548	(a) ·275 Mann. (b) 2·95 Q.F. Schneider	Rgt. 3 Bns.	Rgt., 4 Sqn.	Batt., 4 Guns	5 Infantry Divns., 1 Cav. Division.
Spain	115,090	500,000	(a) 420 (b) 614	(a) ·276 Mauser. (b) 2·95 Q.F.	Rgt., 3 Bns.	Rgt. 4 Sqn.	Batt., 6 Guns	8 Military Districts with total of 14 Divisions.
(n) Sweden ...	26,000	500,000	(a) 240 (b) 400	(a) ·255 Man. (b) 2·95 Q.F.	Rgt., 3 Bns.	Rgt., 5 Sqn.	Batt., 4 Guns	6 Divisions, 1 Cav. Division.
Switzerland...	§ 258,706	258,706	(a) 312 (b) 348	(a) ·295 Schmidt-Rub. (b) 2·95 Q.F.	Rgt., 3 Bns.	Rgt., 3 Sqn.	Batt., 4 Guns	4 Army Corps.
Turkey ...	231,000	1,175,000	(a) 1,220 (b) 1,500	(a) ·301 Mann. (b) 2·95 Krupp Q.F.	Rgt., 4 Bns.	Rgt., 5 Sqn.	Batt., 4 Guns	7 Military Districts and 2 independent Divisions; 35 Divisions in all.
United States ...	* 80,000	‖ 110,000	(a) 144 (b) 313	(a) ·3 Springfield (b) 3-in. Q.F.	Rgt., 3 Bns.	Rgt., 3 Sqn.	Batt., 4 Guns	No peace organization above a regiment.

** H.A. 6 guns.

‡ There are also 32 reserve infantry divisions, rifle brigades, etc., which, in time of war, might be formed into 16 additional army corps.

(B) An increase of 24 battalions is contemplated.

§ There are in addition 249,938 unarmed *Landsturm* available.

* The peace strength of the United States Army may be raised by the President to 104,200 without reference to Congress. This would be done not by creating new units but by an increase of the establishments of existing units.

‖ In addition the Organized Militia numbers 110,000. This force can now be called out for service by the President, and is liable to serve anywhere within or without the limits of the United States. Of the above number (110,000), however, it is estimated that not more than 67,000 officers and men would actually be available for service.

2. Foreign Rifles.

Country.	Name of Rifle.	Calibre.	Loading System.	Shape* of Bullet.	Sighted up to.
					yards
Austria ...	Mannlicher ...	·315	Clip, 5 cart. ...	S	2400
Belgium ...	Mauser	·301	Charger, 5 cart.	R	2297
Bulgaria ...	Mannlicher ...	·315	Clip, 5 cart. ...	S	2133
Denmark ...	Krag-Jorgensen	·315	Charger, 5 cart.	S	2078
France ...	Lebel	·315	Tube fore end 8 cart.	S	2187
Germany ...	Mauser	·311	Charger, 5 cart.	S	2187
Holland ...	Mannlicher ...	·256	Clip, 5 cart. ...	S	2187
Italy ...	"	·256	" 6	S	2187
Japan ...	Year 38	·256	Charger, 5 cart.	S	2187
Norway ...	Krag-Jorgensen	·256	" 5 " ...	S	2400
Russia ...	3 Line	·3	" 5 " ...	S	2100
Spain ...	Mauser	·276	" 5 " ...	S	2187
Sweden ...	"	·256	" 5 " ...	R	2187
Switzerland	Schmidt-Rubin	·295	" 6 " ...	S	2187
Turkey ...	Mauser	·301	" 5 " ...	S	2187
United States	Springfield ...	·3	" 5 " ...	S	2000

*S—Pointed. R—Round nosed.

3. Approximate Ranges of Foreign Guns in Yards.

Country.	H.A.	F.A.	Fd. Howr.	Heavy.	Limit of forward* effect of shrapnel from point of burst in yards.
France	9000	9000	6233	7000	330
Austria	6800	6800	6600	...	260
Denmark	None	6600	None	None	...
Italy	6000	6000	...	...	260
Germany—					
Extreme range					
Time fuze ...	5500	5500	6150	10 cm. gun 9400; 15 cm. gun 9029	275
Maximum Elev.	8800	8800	7700	15 cm. How. 6550; 21 cm. Mortar 8800; 10 cm. gun 12000; 15 cm. gun 11000	...
Holland	6600	6600	None	None	...
Russia	6000	6000	7000	9500	250
Norway	None	6562	...	...	...
Krupp (2·93) ...	...	6600	...	...	...
Sweden	7650	7650	...	...	...
United States ...	7500	7500	6", 7000	4·7", 7600	340
Switzerland—					
Extreme range					
Time fuze ...	...	6100	Mountain Gun.		
Extreme range					
Per fuze ...	...	7000	4800	...	...
Japan	...	9285	6441	10384	340

*The width of ground covered with bullets is approximately ½ of the distance that the shell is burst short of the target.

4. Numbers of the Three Principal Arms in Army Corps, &c., of Foreign Armies.

Name of Country.	Division.			Army Corps.			Cav. Div.	
	Inf. Bns.	Cav. Sqns.	Art. Guns.	Inf. Bns.	Cav. Sqns.	Art. Guns.	Cav. Regts.	Art. Guns.
Austria	14 to 16	3¼	36	42 to 48	9¾	108	4	12
France	12 to 16	1	48	25 to 33	10	144	4 or 6	8
Germany ‡ ...	12*	4	72	25††	8	160§	6	12
Italy	12	...	30	27	5	96	4	12
Japan	12	2	36	...	...	...	†	...
Russia	16	...	48 or 64	32	24	124	4	12
Turkey‖	17	...	24	...	...	...	6	12
United States ...	27¶	3	43	**	**	**	9	24
Denmark ...	No war organization higher than an infantry brigade.							
Holland	15	4	36	No Army Corps.			Cav. Bde. 4 Rgts.	12
Switzerland ...	13	1	24	33	8	72	No divl. orgn. for the Cav.	...
Sweden	12	5	36	No Army Corps.			4	12
Norway	No organization higher than a brigade. Field Army consists of 6 mixed brigades.						...	...

‡ The Army Corps figures are for the normal Army Corps of 2 divisions.

* Includes 24 machine guns.

†† Includes 48 machine guns.

§ Includes 16 heavy guns.

† Brigade, 8 Service squadrons and 8 machine guns. 2 Depôt squadrons.

‖ Complete re-organization in progress.

** No actual establishment is laid down for an Army Corps, but the President is authorized to organize "Army Corps" consisting of 2 or 3 Divisions.

¶ 1 Bn. = about half Bn. British service.

5. Proportion of Guns and Swords to Infantry.

Foreign Army Corps.	Proportion of	
	Guns to 1000 Inf.	Sabres to 1000 Inf.
Austria	3·25	76
France (a)	4·8	65·5
Germany	6·4	48
Italy	3·4	32
Japan (Division)	4·1	40
Russia	4·4	120
United States	3·3	86
Switzerland	2·2	60

(a) For an Army Corps of 25 infantry battalions.

60. WEIGHTS, MEASURES, MONEYS, &c.

The following tables will be found to contain useful information as to weights and measures, both English and foreign, coinage of foreign countries, &c.:—

1. English Weights and Measures.

Measures of Length.

	In.	Ft.	Yds.	Pls.	Ch.	Fs.
Foot...	12	1				
Yard...	36	3	1			
Rod, pole, or perch	198	16½	5½	1		
Chain	792	66	22	4	1	
Furlong	7,920	660	220	40	10	1
Mile...	63,360	5,280	1,760	320	80	8

Particular Measures of Length.

A fathom, 6 feet.

A cable's length = $\frac{1}{10}$ nautical mile = 202·7 yards.

A degree of latitude varies from 68·7 statute miles at the Equator to 69·41 at the Pole.

The following is the length in geographical miles of 1 degree of longitude at various latitudes:—At the Equator, 69·176; at 15° N. or S., 66·832; at 30° N. or S., 59·96; at 45° N. or S., 48·992; at 60° N. or S., 34·676.

A league, 3 miles.

A nautical mile or geographical mile = 2,025¾ yards.

A half-penny is one inch in diameter.

An ordinary gentleman's visiting card measures 3″ × 1¾″.

Square or Surface Measure.

	In.	Ft.	Yds.	Pls.	Ch.	R.
Square foot	144	1				
Square yard	1,296	9	1			
Rod, pole, or perch	39,204	272¼	30¼	1		
Square chain	627,264	4,356	484	16	1	
Rood	1,568,160	10,890	1,210	40	2½	1
Acre	6,272,640	43,560	4,840	160	10	4

A square mile contains 640 acres = 2,560 roods = 6,400 chains = 102,400 rods, poles, or perches = 3,097,600 square yards.

N.B.—The term square feet must not be confounded with feet square. A piece of cloth said to measure 6 square feet consists of 6 squares of a foot each, but a piece said to measure 6 feet square would be 6 feet along each side, and comprise 36 squares of a foot each. Square measure is computed by multiplying the length by the breadth.

Cubic or Solid Measure.

1,728 cubic inches...	1 cubic foot.
27 " feet	1 " yard.
42 " " timber	1 shipping ton.
108 " "	1 stack of wood.
128 " "	1 cord of wood.

Liquid Measure.

	Gals.	Qts.	Pts.
4 gills...	...	...	1
Quart...	...	1	2
Gallon	1	4	8
Firkin	9	36	72
Kilderkin	18	72	144
Barrel	36	144	288
Hogshead of ale	54	216	432
Puncheon	72	288	576
Butt of ale	108	432	864

Dry or Corn Measure.

4 quarts	1 gallon.
2 gallons	1 peck.
4 pecks	1 bushel.
3 bushels (4 of corn)	1 sack.
12 sacks	1 chaldron.
8 bushels or 2 sacks	1 quarter.
5 quarters	1 load.

Measures of Weight.

Avoirdupois Weight.

27¾ grains ... ... = 1 drachm	= 27·34375 grains.
16 drachms ... ... = 1 ounce	= 437·5 "
16 ounces ... ... = 1 pound	= 7000 "
8 pounds ... ... = 1 stone of butcher's meat.	
14 " ... ... = 1 ordinary stone.	
28 " ... ... = 1 quarter (qr.).	
4 quarters ... ... = 1 hundredweight (cwt.).	
20 cwt. ... ... = 1 ton.	

This weight is used in almost all commercial transactions and common dealings.

Troy Weight.

24 grains ... ... =	1 pennyweight.
20 pennyweights ... ... =	1 ounce.
12 ounces ... ... =	1 lb.

Apothecaries Weight.

20 grains	... ...	=	1 scruple.
3 scruples	... ...	=	1 drachm (drm.).
8 drachms	... ...	=	1 oz.

Apothecaries Fluid Measure.

60 minims (drops)	... ...	=	1 fluid drachm.
8 drachms	... ...	=	1 oz.
20 ounces	... ...	=	1 pint.

Useful weights and measures:—1 sovereign = 2 drams; 1 half-crown, 3½ drs.; 1 florin, 3 drs.; 1 shilling, 1½ drs.; 1 threepenny piece, ½ dr.; 1 tablespoonful holds 1 oz.; 1 dessert spoon, ¾ oz.; 1 teaspoon, ¼. These measures are used for veterinary medicine.

Particular Weights.

A stone, horseman's weight	... ...	=	14 lb.
A firkin of butter	... ...	=	56 "
" " soft soap	... ...	=	64 "
A barrel of raisins	... ...	=	112 "
" (or pack) of soft soap	...	=	256 "
A sack—potatoes, 168 lb.; coals, 224 lb.; flour, 280 lb.			
A muid of whole mealies	... ...	=	196 "
" " crushed "	... ...	=	200 "
Bag of coffee	... ...	=	1½ to 1¾ cwt.
" rice (East India)	... ...	=	about 1½ cwt.
Bale of coffee (Mocha)	... ...	=	2 to 2½ cwt.
Barrel of beef	... ...	=	200 lb.
" butter	... ...	=	224 "
" gunpowder	... ...	=	100 "
" tar	... ...	=	25½ gallons
Bushel of coal	... ...	=	80 lb.
Cask of rice (American)	... ...	=	6 cwt.
Chaldron of coal	... ...	=	36 bushels.
Chest of tea (Congou)	... ...	=	about 84 lb.
Gross	... ...	=	12 doz.
Hogshead of sugar	... ...	=	13 to 16 cwt.
Loaf, quartern	... ...	=	4 lb.
Tierce of coffee	... ...	=	5 to 7 cwt.
" sugar	... ...	=	7 to 9 "
Tub of butter	... ...	=	84 lb.

Hay and Straw.

Truss of straw	... ...	=	36 lb.
" old hay	... ...	=	56 "
" new hay	... ...	=	60 "

Load, 36 trusses = straw, 11 cwt. 2 qrs. 8 lb.; old hay, 18 cwt.; new hay, 19 cwt. 1 qr. 4 lb.

Weight of Coal, Wood, &c.

Anthracite, per cubic yard solid	...	=	2,160 lb.
Bituminous " "	...	=	2,025 "
Cannel " "	...	=	1,400 "
Coal, stored in the usual way, solid		=	2,160 "

Coal Storage.

In storing coal, 42 cubic feet of space per ton is required.

A cubic foot fresh water	... ...	=	62½ lb.
" salt "	... ...	=	63½ "
" ash	... ...	=	49 "
" beech	... ...	=	43 "
" birch	... ...	=	49 "
" cork	... ...	=	15 "
" elm ...	... ...	=	36 "
" pine ...	... ...	=	41 "
" oak ...	... ...	=	59 "
" clay ...	... ...	=	125 "
" loose earth	... ...	=	95 "
A cubic yard compressed hay...	...	=	about 225 lb.
" hay in stack	... ...	=	" 125 "
" compressed straw	...	=	" 145 "
" straw in stack ...	... ...	=	" 90 "
" of grain ...	... ...	=	" 20 bushels.

2. Foreign Weights and Measures.

Metric System used in—

Argentine Republic, Austria-Hungary, Belgium, Bolivia, Brazil, Bulgaria, Chili, Columbia, Costa Rica, Ecuador, France, Germany, Greece, Hayti, Italy, Netherlands, Norway, Portugal, Roumania, San Domingo, Servia, Spain, Switzerland, Sweden, Turkey, United States (partially), Venezuela.

Measures of Length.

	inches.	yards.
Millimetre	·039	·001
Centimetre	·394	·011
Decimetre	3·937	·109
Metre	39·37	1·094
Kilometre	39370·79	1093·633

Square Measures.

	sq. yards.	acre.
Centiare	1·196	—
Are (100 square metres)	119·603	·025
Hectare	11960·333	2·471

Measures of Weight.

	oz., troy.	lb., avoir.
Gramme...	·032	·002
Kilogramme	32·15	2·204

Measures of Capacity.

	pints.	gallons.
Litre	1·759	·22
Hectolitre	176·077	22·009

To convert yards to metres multiply by ·914.
" miles to kilometres multiply by 1·609.
" acres to hectares multiply by ·405.
" lbs. avoir. to kilogrammes multiply by ·454.
" gallons to litres multiply by 4·54.

Other Foreign Weights and Measures.

Countries.	Foreign.	English Equivalents.
Russia	Sajen (3 Arshin)	7 feet.
	Verst (500 Sajen)	·663 of a mile (1166·6 yards).
	Sq. Verst	·44 of a sq. mile.
	Pood (40 Funt)	36 lb. avoir.
	Chetverk	5·77 imp. bush.
	Desyatina	2·7 acres.
	Vedro (100 Charkey) ...	2·7 imp. gals.
Denmark	Mil. (2,400 Rode)	4·68 miles.
	Geo. Mil.	4·61 "
	Geo. Sq. Mil.	21·195 sq. miles.
	Tönde land	1·36 acres.
	Tönde (corn)	3·8 imp. bush.
	" (coal)	4·6775 bushels.
	Pund	1·102 lb. avoir.
Turkey	1 arshin	39·37 in.
	1 sultchek	1·7598 imperial pints.
	1 oke	2·204 lb. avoir.
Persia	1 zar (16 gercho)	40·95 in.
	1 farsakh	3·57 miles (about).
	1 collothun	1·309 gals.
	1 seer (16 miscals)	1180 grains, troy.
	1 ratal (100 miscals) ...	1·014 lb. avoir.
	1 maun (40 seers)	6·49 lb. avoir.
Egypt	Diraa or Pik	22·83 inches.
	Kadam	1 foot.
	Kassaba	11·6 feet.
	Feddan	1·04 acre.
	Oke	2·7 lb. avoir.
	Cantar	98·06 lb. avoir.
	Rotl	·99 lb. avoir.
	"	·79 pint.
	Ardeb of wheat (300 rotls) ..	297 lb.
	" barley (250 rotls) ..	247·5 lb.

OTHER FOREIGN WEIGHTS AND MEASURES—*continued.*

Countries.	Foreign.	English Equivalents.
China	Tael (weight)	1·33 oz.
	Catty	1·33 lb. avoir.
	Picul	133⅓ ,,
	Ts'un	1·41 inches.
	Ch'ih (10 Ts'un)	14·1 ,,
	Chang (10 Ch'ih)	141 ,,
	Li	⅓ mile (about).
	Ri (36 Cho)	2·4403 miles.
	Square ri	5·9552 sq. miles.
	Cho (60 Ken)...	119·30 yards.
	Square cho	2·4507 acres.
	Ken (6 Shaku)	1·9884 yards.
	Shaku	11·930 in.
	Tsubo	3·9538 sq. yards.
Japan	Koku (liquid)...	39·7033 gals.
	,, (dry) (10 To)	4·9629 bushels.
	Sho (liquid)	1·5881 quarts.
	,, (dry)	0·1985 pecks.
	Kwan or Kwamme (1000 momme)	8·2673 lb. avoir.
	1 momme	2·1164 drams.
	1 kin (160 momme)... ...	1·3227 lb.
United States	Linear, square and cubic, also lb., avoir., same as English —	
	25 lbs. avoir	1 qr.
	100 lbs	1 cwt.
	2000 lbs.	1 ton.
	1 pint (dry)	·9694 pint.
	1 gallon	·9694 gall.
	1 bushel	·9694 bush.
	1 pint wine or spirits ...	·8331 pint.
	1 pint beer	1·017 pint.

8. INDIAN WEIGHTS AND MEASURES.

Vary in different Provinces, but the following are the more generally used.

	English Equivalents.
Seer (16 Chittaks)	2·057 lb. avoir.
Maund (40 Seers)	82·287 ,,
Chittak	2 oz. avoir.
Tola	180 grains, troy.
Seer (capacity)	1·760 pints.
Hath	18 inches.
Kosa	2000 yards.
Ungul	·75 inches.
Gaz	1 yard.
Bigah	1600 sq. yards.

4. Foreign Moneys.

Countries.	Coins.		English Equivalent.
			s. d.
Austria-Hungary ...	Krone	= 100 Heller	0 10
Denmark	Krone	= 100 Ore	1 1½
Sweden	Krone	= 100 Ore	
Norway	Krone	= 100 Ore	
Belgium	Franc	= 100 Centimes ...	0 9½ or 25 to £
Bulgaria	Lev	= 100 Stotinki	
France	Franc	= 100 Centimes... ...	
Greece	Drachma	= 100 Lepta	
Italy	Lira	= 100 Centesimi ...	
Roumania	Leo	= 100 Bani	
Servia	Dinar	100 Paras	
Spain...	Peseta	= 100 Centesima ...	
Switzerland... ...	Franc	= 100 Centimes ...	
Holland	Gulden	100 Cents	1 8 or 12 to £
German Empire ...	Mark	= 100 Pfennige	1 0
Russia	Rouble	= 100 Kopecks	2 1
Turkey	Piastre	= 40 Paras	0 2·16 or 100 = 18s
United States ...	Dollar	= 100 Cents	4 2
Egypt	Piastre	... ...	0 2½
Argentine Republic	Peso	= 100 Centavos... ...	3 11
Bolivia	Boliviano	= 100 Centavos... ...	1 8
Brazil	Milreis	= 1000 Reis	2 3
Chile	Peso	= 100 Centavos... ...	1 6
Columbia	Peso	... ...	4 1
Ecuador	Sucre	... ...	2 0
Mexico	Dollar	= 100 Cents	2 0
Peru	Sol	... ...	2 0
Uruguay	Peso	= 100 Centesimi ...	4 3
Venezuela	Dollar	= 5 Bolivars	3 11
China...	Tael	= 1600 Cash (varies greatly)	2 10
Japan	Yen	= 100 Sen	2 0½
—	Mexican Dollar much used in Far East		2 0 about.

Above equivalents are only approximate. Rates of exchange vary continually.

5. Indian Moneys.

3 pies = 1 pice.
4 pice = 1 anna.
16 annas = 1 rupee = 16d.
15 rupees = £1.

61. THERMOMETER.

Fahrenheit.	Réaumur.	Centigrade.
0	—14·2	—17·8
14	— 8	—10
32	0	0
50	8	10
68	16	20
86	24	30

To convert Centigrade or Réaumur degrees into Fahrenheit, use formulæ as follows:—

$$F = \frac{9C}{5} + 32$$

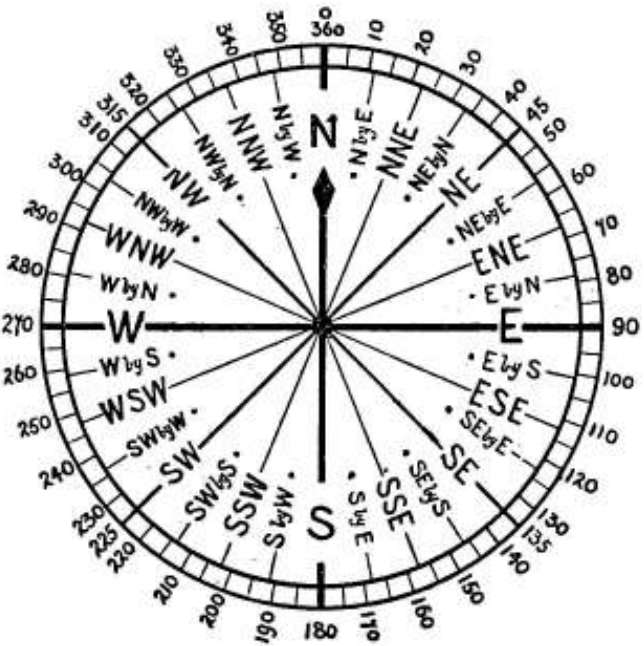
$$F = \frac{9R}{4} + 32$$

$$F = C + R + 32$$

$$\frac{F - 32}{9} = \frac{C}{5} = \frac{R}{4}$$

APPENDIX I.

POINTS OF THE COMPASS.



APPENDIX II.

MAGNETIC VARIATION, 1910.

UNITED KINGDOM.

London	16°	W.
Dublin	20°	"
Glasgow	19½°	"
Galway	20½°	"

EUROPE (CONTINENT OF).

Paris	13½°	W.
Bordeaux	14°	"
Berlin	9°	"
Brussels	13°	"
Lisbon	16°	"
Genoa	10½°	"
Athens	4½°	"

BRITISH DOMINIONS AND COLONIES.

Canada.

Halifax	20½°	W.
Quebec	20½°	"
Montreal	14½°	"
Winnipeg	11°	E.
Esquimalt	22½°	"

Australia.

Sydney	9½°	E.
Melbourne	7½°	"
Adelaide	5°	"
Brisbane	9°	"
Hobart	10°	"
Perth	4°	W.

New Zealand.

Wellington	16°	E.

South Africa.

Cape Town	29°	W.
Durban	22½°	"
Bloemfontein ...	25°	"
Pretoria	20½°	"
Walfisch Bay	28½°	"
Victoria Falls ...	17°	"

Gibraltar	14½°	W.

Sudan and Egypt.

Cairo	3°	W.
Khartoum	4°	"

Tropical Africa.

W. Coast:—

Bathurst (Gambia)...	19°	W.
Freetown (S. Leone)	18½°	"
Accra (Gold Coast)...	16°	"
Lagos (S. Nigeria) ...	15°	"
Coomassie	15°	"
Zungeru (N. Nigeria)	11°	"

E. Coast:—

Mombasa (E. Africa)	6°	W.
Lake Victoria ...	6½°	"
Berbera (Somaliland)	2°	"

Jamaica.

Kingston	2°	E.

Indian Empire.

Bombay	1°	E.
Calcutta	½°	"
Karachi	1½°	"
Peshawar	3½°	"
Dehra Dun	2½°	"
Mandalay	1½°	"

APPENDIX III.

The dates of the full moon for the years 1911-1915 are shown below. By adding 15 to these dates the approximate date of the new moon can be obtained.

Month	1911	1912	1913	1914	1915
Jan.	14	4	22	12	1 30
Feb.	12	2	20	10	—
March	14	2	21	10	1 30
April	13	1 30	20	9	29
May	12	30	19	8	28
June	11	29	18	7	26
July	11	28	17	6	25
August	9	27	16	5	24
Sept.	8	25	15	4	23
Oct.	7	25	14	3	22
Nov.	6	24	13	2	21
Dec.	5	23	13	2	20

APPENDIX IV.

The following table gives the time of sunrise and sunset on certain dates in each month of the year for latitudes between 60° N. and 40° S., the times for intermediate dates and latitudes can be easily interpolated.

SUN'S RISING AND SETTING.

Latitude.	60° N.				50° N.				40° N.				30° N.				20° N.			
	rises.		sets.		rises.		sets.		rises.		sets.		rises.		sets.		rises.		sets.	
	h.	m.	h.	m.	h.	m.	h.	m.	h.	m.	h.	m.	h.	m.	h.	m.	h.	m.	h.	m.
January 1	9	7	2	59	8	1	4	5	7	23	4	43	6	57	5	9	6	38	5	30
,, 16	8	52	3	28	7	56	4	34	7	22	4	58	6	59	5	21	6	40	5	40
February 1	8	29	4	8	7	37	4	51	7	11	5	17	6	53	5	35	6	38	5	50
,, 16	7	40	4	48	7	11	5	17	6	54	5	34	6	40	5	48	6	30	5	58
March 1	7	3	5	22	6	47	5	39	6	36	5	49	6	28	5	57	6	22	6	4
,, 16	6	19	5	59	6	15	6	3	6	13	6	5	6	11	6	7	6	10	6	8
April 1	5	30	6	38	5	40	6	28	5	47	6	21	5	52	6	16	5	56	6	12
,, 16	4	45	7	15	5	8	6	52	5	23	6	37	5	34	6	26	5	43	6	17
May 1	4	2	7	52	4	39	7	15	5	2	6	52	5	19	6	35	5	32	6	22
,, 16	3	24	8	28	4	15	7	37	4	46	7	6	5	8	6	44	5	25	6	27
June 1	2	54	9	2	3	59	7	57	4	36	7	20	5	1	6	55	5	21	6	35
,, 16	2	40	9	20	3	52	8	8	4	32	7	28	5	0	7	0	5	21	6	39
July 1	2	44	9	22	3	56	8	10	4	35	7	31	5	3	7	3	5	25	6	41
,, 16	3	7	9	4	4	10	8	2	4	46	7	26	5	10	7	1	5	30	6	41
August 1	3	42	8	30	4	30	7	42	4	59	7	13	5	20	6	52	5	36	6	36
,, 16	4	18	7	50	4	52	7	16	5	13	6	55	5	28	6	40	5	41	6	27
September 1	4	55	7	5	5	15	6	45	5	28	6	32	5	38	6	22	5	45	6	15
,, 16	5	31	6	19	5	37	6	13	5	42	6	8	5	46	6	4	5	48	6	2
October 1	6	6	5	37	6	0	5	40	5	57	5	43	5	55	5	45	5	52	5	48
,, 16	6	43	4	49	6	24	5	8	6	13	5	19	6	4	5	28	5	56	5	36
November 1	7	23	4	5	6	51	4	37	6	30	4	58	6	15	5	13	6	3	5	25
,, 16	8	2	3	28	7	16	4	14	6	48	4	42	6	27	5	3	6	11	5	19
December 1	8	37	3	1	7	38	4	0	7	4	4	34	6	39	4	59	6	23	5	18
,, 16	9	2	2	49	7	54	3	57	7	17	4	34	6	51	5	1	6	29	5	22

MEAN *LOCAL* TIMES. C

10° N.		Equator.		10° S.		20° S.		30° S.		40° S.	
rises.	sets.	rises.	sets.	rises.	sets.	rises.	sets.	rises.	sets.	rises.	sets.
h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.
6 18	5 48	6 1	6 5	5 44	6 22	5 25	6 41	5 4	7 2	4 36	7 30
6 23	5 37	6 8	6 12	5 52	6 28	5 35	6 45	5 16	7 4	4 52	7 28
6 24	6 4	6 12	6 16	5 58	6 29	5 45	6 43	5 30	6 58	5 11	7 17
6 21	6 7	6 12	6 16	6 2	6 26	5 53	6 35	5 42	6 46	5 28	7 0
6 16	6 9	6 10	6 14	6 5	6 20	5 59	6 26	5 52	6 33	5 44	6 42
6 8	6 10	6 7	6 11	6 5	6 13	6 4	6 14	6 2	6 16	6 0	6 18
5 59	6 9	6 2	6 6	6 5	6 3	6 8	6 0	6 12	5 56	6 16	5 52
5 51	6 9	5 58	6 2	6 5	5 55	6 12	5 48	6 21	5 39	6 31	5 29
5 44	6 10	5 55	5 59	6 6	5 48	6 17	5 37	6 30	5 24	6 46	5 8
5 40	6 12	5 54	5 58	6 8	5 44	6 22	5 30	6 39	5 13	7 0	4 53
5 39	6 17	5 55	6 0	6 12	5 44	6 29	5 26	6 49	5 6	7 14	4 42
5 41	6 19	5 58	6 2	6 15	5 45	6 34	5 26	6 55	5 5	7 22	4 38
5 44	6 22	6 1	6 5	6 18	5 48	6 36	5 30	6 56	5 8	7 24	4 42
5 47	6 24	6 4	6 8	6 19	5 52	6 36	5 35	6 56	5 16	7 20	4 52
5 51	6 21	6 4	6 8	6 17	5 55	6 31	5 41	6 47	5 25	7 8	5 4
5 52	6 16	6 2	6 6	6 12	5 56	6 23	5 45	6 35	5 33	6 49	5 19
5 51	6 9	5 58	6 2	6 4	5 56	6 10	5 50	6 17	5 43	6 26	5 34
5 51	5 59	5 53	5 57	5 55	5 55	5 57	5 53	6 0	5 50	6 2	5 48
5 50	5 50	5 48	5 52	5 46	5 54	5 43	5 57	5 41	5 59	5 37	6 3
5 50	5 42	5 44	5 48	5 37	5 55	5 31	6 1	5 23	6 9	5 14	6 18
5 52	5 36	5 42	5 46	5 32	5 56	5 21	6 7	5 8	6 20	4 52	6 36
5 56	5 34	5 43	5 47	5 29	6 1	5 14	6 16	4 58	6 32	4 37	6 53
6 3	5 35	5 47	5 51	5 30	6 8	5 13	6 25	4 53	6 45	4 28	7 10
6 11	5 41	5 54	5 58	5 37	6 15	5 17	6 34	4 56	6 56	4 28	7 24

APPENDIX V.

LIST OF AUTHORITIES TO WHOM INDENTS SHOULD BE ADDRESSED BY UNITS REQUIRING FOOD, STORES, &c.

Requirements.	Where to Apply.	
	If on L. of C.	If with Field Troops.
Ammunition	A.O.D.	O.C. Ammunition Column.
Arms	"	Ordnance Officer.
Camp Equipment ...	"	"
Clothing*	"	"
Disinfectants	Nearest Supply Depôt ...	Senior Supply Officer.
Equipment	A.O.D.	Ordnance Officer.
Explosives	"	"
Forage	Nearest Supply Depôt ...	Senior Supply Officer.
Fuel	" " " ...	" "
Harness	A.O.D.	Ordnance Officer.
Horses or Mules ...	Nearest Remount Depôt	D. of Rmts. or his representative.
Light (Candles, Oil) ...	Nearest Supply Depôt ...	Senior Supply Officer.
Medical Comforts ...	" " " ...	" "
Medical Stores	Nearest Hospital... ...	O.C. Field Ambulance.
Men	A.G.'s staff	A.G.'s Staff.
Money	Nearest Pay Office ...	Field Paymaster.
Necessaries	A.O.D	Ordnance Officer.
†Oil (for lighting) ...	Nearest Supply Depôt ...	Senior Supply Officer.
Oil (for lubricating) ...	A.O.D.	Ordnance Officer.
Ordnance Stores (except those mentioned separately)	"	"
Picketing gear	"	"
Rations	Nearest Supply Depôt ...	Senior Supply Officer.
Saddlery	A.O.D.	Ordnance Officer.
Signalling gear (except oil)	"	"
Stationery	"	"
Soap	"	" (if no Ordnance Officer available, Senior Supply Officer).
Tools	"	Ordnance Officer.
Transport	Nearest Transport Depôt	Senior Transport Officer.
Veterinary Stores ...	A.V.D.	Veterinary Officer i/c of Unit, or nearest Veterinary Officer.

* In India Supply Depôt.
† Includes oil and wick for signalling.

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Distinguishing Flags and Lamps.

	Position of	Flag (by day)	Lamp (by night)
1	Headquarters of C. in C. of the Forces in the Field.		
2	An Army or group of Divisions.	RED WITH NUMBER IN BLACK.	
3	A Division.	RED WITH NUMBER IN WHITE	
4	A Brigade or of an administrative district.		
5	G.O.C. or O.C. of a line of Communication		
6	A Post Garrison or Base		
7	Ammunition Column		
8	Supply Depôt		
9	Hospital or Field Ambulance (The Geneva flag will be accompanied by the Union Jack.)		
10	Ordnance Depôt		
11	Veterinary Hospital		
12	Telegraph Office		A telegraph office has no lamps, as it will usually be with Divisional Headquarters at night
13	Post Office		
14	Pay Office		
15	Latrine — British		Note:- In India the Flag for British Latrines has a red centre.
	Latrine — Native		
16	Engineer Park — India	R.E.	

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At end of book.